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(54) Title: CHARATERIZATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN CODING REGIONS OF HUMAN GENES

(57) Abstract

The invention provides nucleic acid segments of the human genome, particularly nucleic acid segments from the coding region of a gene, including polymorphic sites. Allele-specific primers and probes hybridizing to regions flanking or containing these sites are also provided. The nucleic acids, primers and probes are used in applications such as phenotype correlations, forensics, paternity testing, medicine and genetic analysis.

CHARACTERIZATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN CODING REGIONS OF HUMAN GENES

RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application Serial No. 60/127,248, filed March 31, 1999, the entire teachings of which are incorporated herein by reference.

GOVERNMENT SUPPORT

The invention was supported, in whole or in part, by grant 5-P50-HG00098-09 SNP from the National Institutes of Health (NCHGR) and grant 1-R01-HL61774-01 from the National Institutes of Health (NHLBI). The Government has certain rights in the invention.

BACKGROUND OF THE INVENTION

A major goal in human genetics is to understand the role of common genetic variants in susceptibility to common diseases (N. Risch and K. Merikangas, *Science, 273*:1516 (1996.); *E. S. Lander, Science, 274*:536 (1996); F.S. Collins, *et al., Science, 278*:1580 (1997)). This requires assembling an extensive catalogue of single-nucleotide polymorphisms (SNPs) and performing systematic association studies for particular diseases.

The human population has relatively limited genetic diversity, reflecting its young age and historically small size (F. J. Ayala *et. al., Proc. Natl. Acad. Sci., 91*:6787 (1994)). Given the restricted nature of the allelic spectrum, some authors have recently suggested that it should eventually be possible to collect all common SNPs in the human population and have hypothesized that such common variants may underlie much of the genetic risk of common disease (N. Risch and K. Merikangas, *Science, 273*:1516 (1996.); *E. S. Lander, Science, 274*:536 (1996); F.S. Collins, *et al., Science, 278*:1580 (1997)). This is in contrast to the situation for rare

Collins, *et al., Science, 278*:1580 (1997)). This is in contrast to the situation for rare genetic diseases, which are primarily caused by a large number of distinct alleles that are recent, rare and highly penetrant Important examples of associations to common (>1%) alleles include the ApoE4 allele in Alzheimer's disease, the Factor V^{Leiden} allele in deep-venous thrombosis, and the CCR5-Δ32 in resistance to HIV infection (A. M. Saunders *et. al., Neurology, 43*:1467 (1993); R. M. Bertina, *Nature, 369*:64 (1994); M. Dean *et. al, Science, 273*:1856 (1996)). The most relevant variants are likely to be those in coding and regulatory regions of genes.

SUMMARY OF THE INVENTION

As described herein, the nature of SNPs in the coding regions of human genes has been explored. SNPs were identified in 106 genes relevant to cardiovascular disease, endocrinology and neuropsychiatry, by screening an average of 114 independent alleles using two independent screening methods. To ensure high accuracy, all reported SNPs were confirmed by DNA sequencing. A total of 545 SNPs were identified, including 395 coding-regions SNPs (cSNPs) divided roughly equally between those causing synonymous and non-synonymous changes. The cSNPs most likely to influence disease, those that alter the amino acid sequence of the encoded protein, show strikingly different properties: they occur at a lower rate and with lower allele frequencies. This likely reflects selection acting against deleterious alleles during human evolution. The lower allele frequency of cSNPs has important implications for the number of chromosomes that must be sampled to construct a comprehensive catalogue of human cSNPs.

The invention relates to a gene which comprises a single nucleotide polymorphism at a specific location. In a particular embodiment the invention relates to the variant allele of a gene having a single nucleotide polymorphism, which variant allele differs from a reference allele by one nucleotide at the site(s) identified in Figures 5A-5QQQQQQQ. Complements of these nucleic acid segments are also included. The segments can be DNA or RNA, and can be double- or single-stranded. Segments can be, for example, 5-10, 5-15, 10-20, 5-25, 10-30, 10-50 or 10-100 bases long. The invention further relates to gene products encoded by genes and oligonucleotides of the invention.

The invention further provides allele-specific oligonucleotides that hybridize to a gene comprising a single nucleotide polymorphism or to the complement of the gene. These oligonucleotides can be probes or primers.

The invention further provides a method of analyzing a nucleic acid from an individual. The method determines which base is present at any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ. Optionally, a set of bases occupying a set of the polymorphic sites shown in Figures 5A-5QQQQQQQ is determined. This type of analysis can be performed on a number of individuals, who are tested for the presence of a disease phenotype. The presence or absence of disease phenotype is then correlated with a base or set of bases present at the polymorphic site or sites in the individuals tested.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a graph showing minor allele frequency by polymorphism type. The percentage of cSNPs having minor allele frequency classified as low (<5%), medium (5-15%) or high (>15%) frequency is displayed for synonymous, non-synonymous and non-coding SNPs.

Figure 2 is a graph showing the distribution of nucleotide diversity. Normalized frequency of variant sites, $\hat{\theta}$, was calculated for the coding region of each gene. The graph shows the percentage of genes having $\hat{\theta}$ in the indicated range.

Figures 3A and 3B are a table showing a summary of polymorphisms in 106 human genes described herein. Column 1 shows the name of the gene as used in Online Mendelian Inheritance in Man. Column 2 shows the number of coding base pairs screened. Column 3 shows the number of synonymous (or silent) polymorphisms identified. Column 4 shows the number of non-synonymous polymorphisms identified. Column 5 shows the number of non-coding base pairs screened. Column 6 shows the number of non-coding polymorphisms, including those in introns and untranslated regions (UTR), identified.

Figure 4 is a table showing polymorphism rates for different classes of sites.

Figures 5A-5QQQQQQQ are a table showing the specific polymorphisms identified in the genes studied as described herein. Column 1 shows the laboratory

designation for the polymorphism. Column 2 shows the name of the gene as used in Online Mendelian Inheritance in Man. Column 3 shows the reference nucleotide which occupies the polymorphic site in the reference allele. Column 4 shows the variant nucleotide which occupies the polymorphic site in the variant allele. Column 5 shows the reference amino acid encoded by the codon which contains the polymorphic site in the reference allele. Column 6 shows the variant or alternate amino acid encoded by the codon which contains the polymorphic site in the variant allele. Column 7 indicates whether the polymorphism is located in the coding or non-coding region of the gene. Column 8 shows the assay number in which the polymorphism was assessed. Columns 9 and 10 show the forward and reverse primers, respectively, which were used to identify the polymorphism. Column 11 shows the sequence of the gene used in the assay, with the polymorphic site indicated by brackets and the primers shown in capital letters. Column 12 shows the total number of nucleotides given in Column 11.

DETAILED DESCRIPTION OF THE INVENTION

There is a rich literature concerning nucleotide variation in model systems, particularly in Drosophila (E. N. Moriyama and J. R. Powell., *Mol. Biol. Evol.*, *13*:261 (1996)), but sequence variation in human genes has been studied only in limited ways. A small number of studies have focused on individual genes (such as beta-globin and lipoprotein lipase) in many individuals, and one study examined 49 genes by comparing two independent sequences deposited in public databases (R. M. Harding *et. al.*, *Am. J. Hum. Genet.*, *60*:772 (1997); D. A. Nickerson *et. al.*, *Nature Genetics*, *19*:233 (1998); W. H. Li and L.A. Sadler, *Genetics 129*:513 (1991)). To perform a more comprehensive survey, as described herein, a collection of 106 genes were selected whose protein products play important roles in the cardiovascular, endocrine and neurological systems (Figures 3A-3B and Figures 5A-5QQQQQQQ). Gene sequences were obtained from the Genbank and TIGR databases. Where multiple sequence depositions were available, a consensus sequence was derived. Determination of coding sequence, untranslated regions and intronic regions was based on annotation in the public database, although internal

checks were performed to ensure accurate determination of start and stop codons, open reading frames and the like.

The genes were chosen because of their relevance to common, clinically significant diseases, such as coronary artery disease, diabetes, and schizophrenia. They encode proteins involved in coagulation, lipid metabolism, energy metabolism, neuroendocrine physiology, neurotransmission and central nervous system development. Variation in these genes was studied in a sample including Caucasians, African-Americans, African Pygmies and Asians, with an average of 114 chromosomes screened for each gene. Of the samples screened, 30 were from Caucasian individuals, 14 from Asian, 10 African American and 7 Africans. The average number of individuals successfully screened for each gene was 57, with the precise number successfully screened varying among genes. Cell lines were obtained from Coriell Cell Repository, and DNA prepared according to standard protocols. In addition, 10 of the Caucasian samples used in this study were obtained as anonymous blood samples from the Physician's Health Study (gift of Charles Hennekens and J. Michael Gaziano). The sample size provides greater than 65% power to detect alleles with frequency of 1%.

Overall, the sample of 114 chromosomes was screened for SNPs in a total of 195.4 kb, consisting of 135.8 kb of coding regions and 59.6 kb from adjacent non-coding region (untranslated region (UTR) and introns). Sequences were amplified by the polymerase chain reaction (PCR) and screened by two independent methods. The first method involved hybridization of labeled PCR products to variant detector arrays (VDAs) (that is, high density DNA probe arrays containing oligonucleotides specific for the sequences under study) (M. Chee *et. al., Science, 274*:610 (1996); D. G. Wang *et. al., Science, 280*:1077 (1998)); variant sequences typically give rise to altered hybridization patterns. These chips contained variant detector arrays (VDA) (M. Chee *et al., Science 274*:610 (1996)).

Using VDAs, candidate SNPs were identified using a combination of three algorithms followed by visual inspection. For each base position and strand queried there are four VDA features: one contains the expected base (the reference sequence) in the central position and the other three features contain central substitution bases (in the background of the reference sequence). The base-calling

algorithm looked for positions at which hybridization to a substitution base gives a stronger signal than the reference base. The second algorithm (mutant fraction) examined the reference base and each one of the substitution bases in turn and calculates the fraction of signal present in the non-reference base. The final algorithm (footprint detection) depends upon a loss of signal at the reference positions surrounding a nucleotide substitution. These algorithms are combined to yield a confidence score of "certain" or "likely" for each candidate polymorphism. Two analysts independently scored the data, and candidate polymorphisms found by either observer were included in subsequent confirmation tests. PCR assays spanning each exon were designed using Primer 3.0 release 0.7. PCR was performed according to standard protocols, and assays destined to be hybridized to the same chip design were pooled together. Chip samples were prepared and hybridized as described in D.G. Wang *et al.* (*Science 280*:1077 (1998)), except that pools consisting of about 100 assays contained 5-6 μg of amplified material. In all, 854 assays (average size of 300 bp, covering 106 genes) were amplified from each individual and were hybridized to 12 distinct chip designs. The probe arrays were designed to query only the coding sequence for some genes, while other genes contained the entire mRNA and/or surrounding intron (Figures 3A-3B). The second method involved subjecting PCR products to Denaturing HPLC (dHPLC) (P. J. Oefner and P. A. Underhill, *Am. J. Hum. Genet., 57*:A266 (1995)) at a critical temperature; heterozygous individuals typically give rise to heteroduplex products with altered denaturation and migration properties.

Sequences were amplified as above except that the final extension in the PCR protocol was followed by denaturation and slow reannealing to allow heteroduplex formation. A total of 6 μl of each individual PCR product was injected into Wave DNA Fragment Analysis System (Transgenomic). A total of 592 of the VDA assays (covering the 89 genes attempted with this method) were successfully screened by DHPLC. Only assays of >160 base pairs were used for DHPLC, because shorter assays performed unreliably for mutation detection. The DHPLC parameters (percentage of acetonitrile, column temperature) used for each fragment were automatically calculated using a novel predictive algorithm, and DHPLC traces were analyzed using the clustering program ASH v2.0. A scoring

algorithm was developed based upon the similarity score by ASHv2.0 and contour of the elution profile.

Because both screening methods can generate to a significant number of false positives, it was important to confirm every reported SNP. Samples implicated by either method as containing a candidate SNP were thus subjected to fluorescent dideoxy sequencing, either to confirm the presence of the SNP (in the case of the chip) or to identify and confirm the presence of the SNP (in the case of DHPLC). Such confirmation proved essential for eliminating false positives.

Candidate SNPs were either validated (if found by VDAs) or identified (if implicated by DHPLC) by DNA sequencing. For this purpose, sequences were amplified with PCR primers tailed with standard M13 sequencing sites (-21 forward and -28 reverse) and conventional dye-primer sequencing was performed on ABI 377 sequencers. For candidate SNPs discovered by VDAs, one individual was chosen (a candidate homozygous variant, when available, or a candidate heterozygote) and sequencing was performed on one strand to confirm by visual inspection the presence of the SNP at the indicated position. For amplicons found to be polymorphic by DHLPC, two individuals were selected representing each distinct elution pattern observed and were sequenced on both strands to discover the variant base or bases. Sequences were base-called by the Phred program, assembled by the Phrap program, and polymorphism candidates were identified by the PolyPhred program (D. A. Nickerson *et. al., NAR, 25*:2745 (1997). All results were visually inspected by at least two observers.

The overall false positive rate for VDAs was 45%. The rate was much lower (about 10%) for certain chip designs, synthesis protocols, and for candidate polymorphisms scored as "certain." The false positive rate among fragments displaying an altered elution pattern by DHPLC was similar (40%). The false positive rates reflect the thresholds employed for declaring a candidate SNP, which were chosen to ensure high sensitivity.

A total of 545 SNPs were identified in the 195 kb surveyed, consisting of 150 non-coding SNPs and 395 cSNPs. Results from these studies are shown in the Figures. The complete data are available on the web site http://www.genome.wi.mit.edu/cvar_snps; access to this website can be gained

using the guestname "snp_pilot" and the password "noynek". In the future, access to this website may be available to the public, and thus, no guestname or password may be needed.

To directly determine the false-negative rate of the screen, conventional DNA sequencing was performed on ten of the genes (THPO, TBAX2R, PTHLH, IGF2, HTR2A, HTR1A, GHR, GABRB1, F10, and CYP11B1) spanning 25.2 kb in twenty individuals. Sequencing was performed on both strands using dye-primer chemistry and sequence traces were interpreted using PolyPhred (D.A. Nickerson *et. al., NAR, 25*:2745 (1997)). VDA analysis identified 85% of variants found by direct sequencing , while DHPLC identified 87% of the variants found by direct sequencing. In regions screened by both VDAs and DHPLC, the combination of the two methods identified 100% of the polymorphisms found by direct sequencing.

Overall, about one-third of individuals were screened with both methods, and one-third were screened with each of the two methods alone. (For some genes, the non-coding regions were screened only by DHPLC.) It is estimated that the false negative rate over the entire study to be about 15% for regions screened by one method, and negligible for sequences screened by both methods. The total number of true polymorphisms not identified is estimated to be less than 10%.

A SNP survey can be characterized in terms of either K, the observed number of variant sites, or p, the observed heterozygosity per bp. Because K increases with the number of chromosomes (n) studied and the total sequence length L, it is preferable to use the normalized number of variant sites

$\hat{\theta} = K / \left(\sum_{i+1}^{n-1} i^{-1}\right) L$ which corrects for sample size. Under the neutral theory of molecular evolution and infinite sites model, θ and π are both estimators of the population genetic parameter $\theta = 4N\mu$ (Li, *Molecular Evolution, Sinauer Associates* (1997), Canada).

SNPs were found at a similar overall frequency in coding and non-coding regions. SNPs in coding region occurred at a frequency of 1 per 344 bp, corresponding to $\hat{\theta} = 5.47 \times 10^{-4}$ and $\pi = 5.07 \times 10^{-4}$. Interestingly, SNPs were observed in non-coding DNA at a similar frequency of 1 per 397 bp. The

normalized number of variant sites was $\hat{\theta} = 4.93 \times 10^{-4}$, and the mean heterozygosity (π) = 5.05×10^{-4} (Figure 4). Calculations of π involve allele frequencies. Polymorphisms identified by DHPLC alone were excluded because we did not sequence all of the samples showing a variant DHPLC pattern and thus could not be certain of allele frequency. The estimates of π were thus based on 411 of 545 polymorphisms. Although the VDAs were designed for polymorphism discovery rather than genotyping, the estimated allele frequencies proved to be quite accurate. Specifically, genotyping assays (employing single-base extension assays) for 25 SNPs yielded allele frequencies that differed by an average of only 2% from those estimated on the basis of genotypes inferred from the VDA. For both classes, the similar values for $\hat{\theta}$ and π is consistent with a population evolving according to neutral expectations.

The 395 cSNPs were roughly equally divided between synonymous (203 cSNPs) and non-synonymous (192 cSNPs) changes. Since approximately two-thirds of random mutations would alter an amino acid, the fact that non-synonymous cSNPs comprise slightly less than half of the cSNPs implies strong selection against amino-acid altering changes. To address this issue more directly, the nucleotide diversity was examined at four-fold degenerate sites, two-fold degenerate sites, and non-degenerate sites. Changes at four-fold degenerate sites produce only synonymous changes, while those at non-degenerate sites are always non-synonymous. Nucleotide diversity ($\hat{\theta}$) was 9.64×10^{-4} at four-fold degenerate sites, 6.85×10^{-4} at two-fold degenerate sites, and 3.70×10^{-4} at non-degenerate sites. Assuming that mutations occur at an equal rate at both classes of sites, non-synonymous variants survive to be detected in such a survey at only 38% of the rate of synonymous changes.

The force of selection is also evident in comparing non-synonymous cSNPs causing a non-conservative amino acid alteration with those causing a conservative amino-acid change. Conservative and non-conservative amino acid substitutions were defined for this analysis according to the BLOSUM62 matrix, used in sequence comparison (S. Henikoff and J. G. Henikoff, *PNAS, 89*:10915 (1992). Conservative changes were those having a positive or neutral sign in the matrix, while non-conservative changes were those having a negative value Non-conservative

cSNPs represent only 36% of the non-synonymous cSNPs, whereas randomly distributed mutations would be expected to produce a higher proportion (52%) of non-conservative changes. The proportion of non-synonymous SNPs expected to cause a non-conservative amino acid substitution was determined based on the actual codon usage in the 106 genes studied, the known frequencies of transitions and transversions, and the definition of non-conservative changes employed in the BLOSUM62 matrix. This implies that non-conservative cSNPs survive to be detected in such a survey at only about half of the rate of conservative, non-synonymous cSNPs.

The various types of SNPs differ not only in the rate of their occurrence, but also in the frequency of their minor alleles. This can be seen in several ways. When SNPs are classified according to whether the frequency of the minor allele was high ($\geq$15%),intermediate (5-15%) or low ($\leq$5%), it is clear that the non-synonymous cSNPs were enriched in low frequency alleles compared to the rest of the collection (Figure 1). The distribution of non-synonymous allele frequencies was significantly different than that of synonymous changes ($p=0.02$, Kolmogorov-Smirnov test). Indeed, more than half (58%) of non-synonymous cSNPs were found at a frequency below 5%, with this effect evident for both conservative and non-conservative substitutions.

The effect of selection can also be inferred by considering the average frequency of the minor allele: it is 8% for non-conservative cSNPs, 11% for conservative but non-synonymous cSNPs, and 14% for both synonymous cSNPs and non-coding SNPs. In addition, the lower allele frequency of non-synonymous cSNPs is reflected in the fact that the heterozygosity π is lower than the normalized rate of variant sites $\hat{\theta}$ for this class of SNPs (Figure 4). This divergence is in the direction predicted by the action of purifying selection, although it falls short of statistical significance. Tajima's D was non-significant. (F. Tajima, *Genetics, 123*:545 (1989).

The distribution of SNPs among the 106 genes was explored, with an eye toward detecting differential effects of selection among genes. The number of cSNPs per gene ranged from 37 for Factor V to 0 for thirteen of the genes, and the normalized rate, $\hat{\theta}$, similarly showed considerable variation (Figure 2). The

observed variation in nucleotide diversity is similar in magnitude to that observed for Drosophila (E. N. Moriyama and J. R. Powell., *Mol. Biol. Evol., 13*:261 (1996)). Variation among genes could be due to many factors (D. J. Begun and C. F. Aquadro, *Nature, 356*:519 (1993); Nachman *et. al., Genetics, 150*:1133 (1998)). The fact that non-synonymous cSNPs show a somewhat wider variation than synonymous cSNPs (the coefficient of variation is 20% larger for the former class) is consistent with differences in selective constraints among loci, but the difference falls well below statistical significance. A variety of population genetic tests are available for testing selection at individual loci (M. L. Wayne and K. L. Simonson, *Trends and Ecology and Evolution, 13*:236 (1998)).

The age of a SNP allele has important implications for its use in human genetic studies. Recently-occurring SNP alleles are more likely to show extensive linkage disequilibrium (retention of the ancestral haplotype on which they arose) as compared to older SNPs. Such linkage disequilibrium can provide a powerful tool in identifying disease genes (E. S. Lander, N.J. Schork, *Science, 265*:2037 (1994)). Although the precise age of the SNPs could not be assessed from these studies, characterization of which allele preceded human speciation and which arose thereafter was sought. To determine the ancestral human allele, each corresponding gene was sequenced from the common chimpanzee (P. *troglodytes*). Each assay used in the human survey was amplified from a single chimpanzee (DNA gift of Kristin Ardlie) and subjected to dye-primer sequencing on both strands. A single chimpanzee sample will accurately reveal the ancestral allele except in cases where the site has mutated and fixed during the chimpanzee evolution or is polymorphic in the chimpanzee population and happened to be homozygous for the non-ancestral allele. These two cases are quite rare (probably less than 2%) and thus have been neglected for the purpose of estimating overall rates. A human allele was considered to be ancestral if it was present in the homozygous state in the chimpanzee sample. A total of 136 kb of chimpanzee sequence was obtained, revealing an inter-species divergence of 0.6% in the regions studied.

An elegant result in theoretical population genetics predicts that the probability that a neutral allele represents the ancestral state should be equal to its frequency in the population (G. A. Watterson and H. A. Guess, *Theoretical*

Population Biology, 11:141 (1977)). The minor allele should thus represent the ancestral state in a predictable proportion of cases. The ancestral allele and minor allele frequency was determined for 267 of the reported SNPs. For 3 of the 267 SNPs, the chimpanzee was homozygous for a third allele differing from both of the current human alleles. This is consistent with the overall 0.6% nucleotide sequence divergences seen between human and chimpanzee. Among polymorphisms with a minor allele frequency below 10%, the average allele frequency was 3% and the proportion that was ancestral was 7% (11/158) of cases. Among polymorphisms with minor alleles exceeding 10%, the mean frequency was 28% and the proportion that were ancestral was 32% (35/109). These results thus agree remarkably well with the theoretical prediction, providing the first reported test of this prediction in humans. It therefore follows that the minor SNP allele need not be the younger allele; this has implications for linkage disequilibrium mapping.

The distribution of SNPs among Caucasian, African-American, African and Asian samples was also examined. Although the vast majority of SNPs were seen in multiple groups, there was a statistically significant excess of SNPs that were seen in only one of the sub-groups. The probability that a SNP occurring k>1 times in an overall sample of n individuals would be found entirely within a given subset of m individuals is B(n,k)/B(m,k), where B(x,y) is the binomial coefficient x!/(x-y)!y!. In this fashion, the probability that each individual SNP would be confined to a particular ethnic subgroup within the sample was calculated and these probabilities were summed to obtain the number of SNPs expected to be confined to the group within the sample. The fact that a SNP is found only within one group in the sample does not necessarily imply that it is private to that group within the general population, owing to the small sample size, but it can be used as an indication of substructure. The number of SNPs with k > 1 confined to the, African-Americans, African Pygmies, Caucasians, and Asians was 17, 17, 12, and 9, as compared to expectations of 3.02, 1.34 , 8.62, and 1.81. Not surprisingly, the greatest excess was seen for SNPs found in the African-American and African samples. The presence of population substructure implies that construction of a comprehensive SNP database should employ a diverse set of DNA samples.

The results of this survey provide a fundamental description of sequence variation in the coding regions of human genes. These data indicate that two copies of a gene chosen from the human population will differ by roughly one base in 2 kb, corresponding to somewhat less than one heterozygous base within the coding region of a typical gene. In general, there are only a handful of such cSNPs per gene that exhibit allele frequencies of at least a few percent. Accounting for both the different rate and frequency of non-synonymous SNPs, only about 40% of these observed changes will alter the encoded amino acid. The action of purifying selection during human evolution is evident from the comparatively lower rate of non-synonymous cSNPs, and especially of those that create a non-conservative change. It is clear that non-synonymous cSNPs not only occur less often, but also have lower minor allele frequencies: 60% of non-synonymous cSNPs, the class likely to have the most dramatic effects on proteins, display a minor allele frequency below 5%.

The relative rarity of cSNPs has important implications for efforts to produce large catalogues of human variants. It has been proposed that most human SNPs could be found by performing shotgun sequencing on a handful of individuals (J. L. Weber and E. W. Myers, *Genome Research, 7*:401 (1997); J. C. Venter *et. al., Science, 280*:1540 (1998)). Although such a project will surely identify many SNPs, results described herein suggest that the small sample size will likely fail to identify the vast majority of cSNPs likely to have the most important biological consequences, owing to their lower average allele frequencies. A comprehensive collection of the common, non-conservative cSNPs may require surveying 50-100 chromosomes. Because coding sequence represents only about 3% of the genome, it may prove inefficient to obtain such deep coverage of cSNPs by shotgun sequencing of genomic DNA. Instead, it may be more efficient to perform shotgun sequencing on cDNA libraries from multiple individuals or to amplify genes from multiple individuals, as done here.

Interestingly, a similar rate of polymorphism in coding and non-coding DNA was found. Furthermore, the observed rate of nucleotide diversity at four-fold degenerate sites was nearly twice that in adjacent non-coding regions, and over twice that at non-degenerate sites (Figure 4). Similar results have been reported for

Drosophila (E. N. Moriyama and J. R. Powell., *Mol. Biol. Evol., 13*:261 (1996)) and for a smaller human data set by Li and Sadler (R. M. Harding *et. al., Am. J. Hum. Genet., 60*:772 (1997); D. A. Nickerson *et. al. , Nature Genetics, 19*:233 (1998); W. H. Li and L.A. Sadler, *Genetics 129*:513 (1991)), who observed over three times the nucleotide diversity at four-fold degenerate sites ($\hat{\theta} = 11 \times 10^{-4}$), as compared to that in both untranslated regions and non-degenerate sites ($\hat{\theta} = 3 \times 10^{-4}$). These observations suggest that non-coding DNA adjacent to coding regions may be functionally constrained to a surprising degree.

SNPs can be used to search for genes underlying complex traits in two distinct ways: linkage disequilibrium (LD) studies and association studies (E. S. Lander, N.J. Schork, *Science, 265*:2037 (1994)). Genome-wide LD studies involve using a dense collection of SNPs as markers to search for an ancestral haplotype carrying a disease-susceptibility allele. Such studies cannot be undertaken without the availability of an extremely dense SNP map and their potential for success depends sensitively on many population genetic assumptions. Association studies are more straightforward because they directly test the hypothesis that a specific SNP increases disease risk. They make few assumptions, and require only the availability of a suitable database of appropriate SNPs. In the near term, focusing on cSNPs is likely to be most productive inasmuch as the class is easily recognized (in contrast to regulatory polymorphisms) and is likely to contain a significant proportion of the disease-susceptibility alleles.

The present invention relates to a gene which comprises a single nucleotide polymorphism (SNP) at a specific location. The gene which includes the SNP has at least two alleles, referred to herein as the reference allele and the variant allele. The reference allele (prototypical or wild type allele) has been designated arbitrarily and typically corresponds to the nucleotide sequence of the gene which has been deposited with GenBank or TIGR under a given Accession number. The variant allele differs from the reference allele by one at least one nucleotide at the site(s) identified in Figures 5A-5QQQQQQQ. The present invention also relates to variant alleles of the described genes and to complements of the variant alleles. The invention further relates to portions of the variant alleles and portions of complements of the variant alleles which comprise (encompass) the site of the SNP

and are at least 5 nucleotides in length. Portions can be, for example, 5-10, 5-15, 10-20, 5-25, 10-30, 10-50 or 10-100 bases long. For example, a portion of a variant allele which is 5 nucleotides in length includes the single nucleotide polymorphism (the nucleotide which differs from the reference allele at that site) and four additional nucleotides which flank the site in the variant allele. These nucleotides can be on one or both sides of the polymorphism. Polymorphisms which are the subject of this invention are defined in Figures 5A-5QQQQQQQ with respect to the reference sequence deposited in GenBank under the Accession number indicated. For example, the invention relates to a portion of a gene (e.g., AADC) having a partial nucleotide sequence as shown in Figures 5A-5QQQQQQQ comprising a single nucleotide polymorphism at a specific position. The reference nucleotide for AADC is shown in column 3 and the variant nucleotide is shown in column 4 of Figures 5A-5QQQQQQQ. The nucleotide sequences of the invention can be double- or single-stranded.

The invention further provides allele-specific oligonucleotides that hybridize to a gene comprising a single nucleotide polymorphism or to the complement of the gene. These oligonucleotides can be probes or primers.

The invention further provides a method of analyzing a nucleic acid from an individual. The method determines which base is present at any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ. Optionally, a set of bases occupying a set of the polymorphic sites shown in Figures 5A-5QQQQQQQ is determined. This type of analysis can be performed on a number of individuals, who are tested for the presence of a disease phenotype. The presence or absence of disease phenotype is then correlated with a base or set of bases present at the polymorphic site or sites in the individuals tested.

An oligonucleotide of this invention can be DNA or RNA, and single- or double-stranded. Oligonucleotides can be naturally occurring or synthetic, but are typically prepared by synthetic means. Preferred oligonucleotides of the invention include segments of DNA, or their complements, which include any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ. The segments can be between 5 and 250 bases, and, in specific embodiments, are between 5-10, 5-20, 10-20, 10-50, 20-50 or 10-100 bases. The polymorphic site can occur within any

position of the segment. The segments can be from any of the allelic forms of DNA shown in Figures 5A-5QQQQQQQ.

As used herein, the terms "nucleotide" and "nucleic acid" are intended to be equivalent. The terms "nucleotide sequence", "nucleic acid sequence" "nucleic acid molecule" and "segment" are intended to be equivalent.

Hybridization probes are oligonucleotides which bind in a base-specific manner to a complementary strand of nucleic acid. Such probes include peptide nucleic acids, as described in Nielsen *et al.*, *Science* 254, 1497-1500 (1991). Probes can be any length suitable for specific hybridization to the target nucleic acid sequence. The most appropriate length of the probe may vary depending upon the hybridization method in which it is being used; for example, particular lengths may be more appropriate for use in microfabricated arrays, while other lengths may be more suitable for use in classical hybridization methods. Suitable probes and primers can range from about 5 nucleotides to about 30 nucleotides in length. For example, probes and primers can be 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 25, 26, 28 or 30 nucleotides in length. The probe or primer preferably contains at least one polymorphic site occupied by any of the possible variant nucleotides. The nucleotide sequence can correspond to the coding sequence of the allele or to the complement of the coding sequence of the allele.

As used herein, the term "primer" refers to a single-stranded oligonucleotide which acts as a point of initiation of template-directed DNA synthesis under appropriate conditions (*e.g.*, in the presence of four different nucleoside triphosphates and an agent for polymerization, such as, DNA or RNA polymerase or reverse transcriptase) in an appropriate buffer and at a suitable temperature. The appropriate length of a primer depends on the intended use of the primer, but typically ranges from 15 to 30 nucleotides. Short primer molecules generally require cooler temperatures to form sufficiently stable hybrid complexes with the template. A primer need not reflect the exact sequence of the template, but must be sufficiently complementary to hybridize with a template. The term primer site refers to the area of the target DNA to which a primer hybridizes. The term primer pair refers to a set of primers including a 5' (upstream) primer that hybridizes with the 5'

end of the DNA sequence to be amplified and a 3' (downstream) primer that hybridizes with the complement of the 3' end of the sequence to be amplified.

As used herein, linkage describes the tendency of genes, alleles, loci or genetic markers to be inherited together as a result of their location on the same chromosome. It can be measured by percent recombination between the two genes, alleles, loci or genetic markers.

As used herein, polymorphism refers to the occurrence of two or more genetically determined alternative sequences or alleles in a population. A polymorphic marker or site is the locus at which divergence occurs. Preferred markers have at least two alleles, each occurring at frequency of greater than 1%, and more preferably greater than 10% or 20% of a selected population. A polymorphic locus may be as small as one base pair. Polymorphic markers include restriction fragment length polymorphisms, variable number of tandem repeats (VNTR's), hypervariable regions, minisatellites, dinucleotide repeats, trinucleotide repeats, tetranucleotide repeats, simple sequence repeats, and insertion elements such as Alu. The first identified allelic form is arbitrarily designated as the reference form and other allelic forms are designated as alternative or variant alleles. The allelic form occurring most frequently in a selected population is sometimes referred to as the wildtype form. Diploid organisms may be homozygous or heterozygous for allelic forms. A diallelic or biallelic polymorphism has two forms. A triallelic polymorphism has three forms.

By altering amino acid sequence, SNPs may alter the function of the encoded proteins. The discovery of the SNP facilitates biochemical analysis of the variants and the development of assays to characterize the variants and to screen for pharmaceutical that would interact directly with on or another form of the protein. SNPs (including silent SNPs) may also alter the regulation of the gene at the transcriptional or post-transcriptional level. SNPs (including silent SNPs) also enable the development of specific DNA, RNA, or protein-based diagnostics that detect the presence or absence of the polymorphism in particular conditions.

A single nucleotide polymorphism occurs at a polymorphic site occupied by a single nucleotide, which is the site of variation between allelic sequences. The site

is usually preceded by and followed by highly conserved sequences of the allele (e.g., sequences that vary in less than 1/100 or 1/1000 members of the populations).

A single nucleotide polymorphism usually arises due to substitution of one nucleotide for another at the polymorphic site. A transition is the replacement of one purine by another purine or one pyrimidine by another pyrimidine. A transversion is the replacement of a purine by a pyrimidine or vice versa. Single nucleotide polymorphisms can also arise from a deletion of a nucleotide or an insertion of a nucleotide relative to a reference allele. Typically the polymorphic site is occupied by a base other than the reference base. For example, where the reference allele contains the base "T" at the polymorphic site, the altered allele can contain a "C", "G" or "A" at the polymorphic site.

Hybridizations are usually performed under stringent conditions, for example, at a salt concentration of no more than 1 M and a temperature of at least 25°C. For example, conditions of 5X SSPE (750 mM NaCl, 50 mM NaPhosphate, 5 mM EDTA, pH 7.4) and a temperature of 25-30°C, or equivalent conditions, are suitable for allele-specific probe hybridizations. Equivalent conditions can be determined by varying one or more of the parameters given as an example, as known in the art, while maintaining a similar degree of identity or similarity between the target nucleotide sequence and the primer or probe used.

The term "isolated" is used herein to indicate that the material in question exists in a physical milieu distinct from that in which it occurs in nature. For example, an isolated nucleic acid of the invention may be substantially isolated with respect to the complex cellular milieu in which it naturally occurs. In some instances, the isolated material will form part of a composition (for example, a crude extract containing other substances), buffer system or reagent mix. In other circumstance, the material may be purified to essential homogeneity, for example as determined by PAGE or column chromatography such as HPLC. Preferably, an isolated nucleic acid comprises at least about 50, 80 or 90 percent (on a molar basis) of all macromolecular species present.

I. Analysis of Polymorphisms

A. Preparation of Samples

Polymorphisms are detected in a target nucleic acid from an individual being analyzed. For assay of genomic DNA, virtually any biological sample (other than pure red blood cells) is suitable. For example, convenient tissue samples include whole blood, semen, saliva, tears, urine, fecal material, sweat, buccal, skin and hair. For assay of cDNA or mRNA, the tissue sample must be obtained from an organ in which the target nucleic acid is expressed. For example, if the target nucleic acid is a cytochrome P450, the liver is a suitable source.

Many of the methods described below require amplification of DNA from target samples. This can be accomplished by e.g., PCR. *See generally PCR Technology: Principles and Applications for DNA Amplification* (ed. H.A. Erlich, Freeman Press, NY, NY, 1992); *PCR Protocols: A Guide to Methods and Applications* (eds. Innis, *et al.*, Academic Press, San Diego, CA, 1990); Mattila *et al.*, *Nucleic Acids Res.* 19, 4967 (1991); Eckert *et al.*, *PCR Methods and Applications* 1, 17 (1991); *PCR* (eds. McPherson *et al.*, IRL Press, Oxford); and U.S. Patent 4,683,202.

Other suitable amplification methods include the ligase chain reaction (LCR) (see Wu and Wallace, *Genomics* 4, 560 (1989), Landegren *et al.*, *Science* 241, 1077 (1988), transcription amplification (Kwoh *et al.*, *Proc. Natl. Acad. Sci. USA* 86, 1173 (1989)), and self-sustained sequence replication (Guatelli *et al.*, *Proc. Nat. Acad. Sci. USA,* 87, 1874 (1990)) and nucleic acid based sequence amplification (NASBA). The latter two amplification methods involve isothermal reactions based on isothermal transcription, which produce both single stranded RNA (ssRNA) and double stranded DNA (dsDNA) as the amplification products in a ratio of about 30 or 100 to 1, respectively.

B. Detection of Polymorphisms in Target DNA

There are two distinct types of analysis of target DNA for detecting polymorphisms. The first type of analysis, sometimes referred to as de novo characterization, is carried out to identify polymorphic sites not previously characterized (i.e., to identify new polymorphisms). This analysis compares target

sequences in different individuals to identify points of variation, i.e., polymorphic sites. By analyzing groups of individuals representing the greatest ethnic diversity among humans and greatest breed and species variety in plants and animals, patterns characteristic of the most common alleles/haplotypes of the locus can be identified, and the frequencies of such alleles/haplotypes in the population can be determined. Additional allelic frequencies can be determined for subpopulations characterized by criteria such as geography, race, or gender. The de novo identification of polymorphisms of the invention is described in the Examples section. The second type of analysis determines which form(s) of a characterized (known) polymorphism are present in individuals under test. There are a variety of suitable procedures, which are discussed in turn.

1. Allele-Specific Probes

The design and use of allele-specific probes for analyzing polymorphisms is described by e.g., Saiki *et al.*, *Nature* 324, 163-166 (1986); Dattagupta, EP 235,726, Saiki, WO 89/11548. Allele-specific probes can be designed that hybridize to a segment of target DNA from one individual but do not hybridize to the corresponding segment from another individual due to the presence of different polymorphic forms in the respective segments from the two individuals. Hybridization conditions should be sufficiently stringent that there is a significant difference in hybridization intensity between alleles, and preferably an essentially binary response, whereby a probe hybridizes to only one of the alleles. Some probes are designed to hybridize to a segment of target DNA such that the polymorphic site aligns with a central position (e.g., in a 15-mer at the 7 position; in a 16-mer, at either the 8 or 9 position) of the probe. This design of probe achieves good discrimination in hybridization between different allelic forms.

Allele-specific probes are often used in pairs, one member of a pair showing a perfect match to a reference form of a target sequence and the other member showing a perfect match to a variant form. Several pairs of probes can then be immobilized on the same support for simultaneous analysis of multiple polymorphisms within the same target sequence.

2. Tiling Arrays

The polymorphisms can also be identified by hybridization to nucleic acid arrays, some examples of which are described in WO 95/11995. One form of such arrays is described in the Examples section in connection with de novo identification of polymorphisms. The same array or a different array can be used for analysis of characterized polymorphisms. WO 95/11995 also describes subarrays that are optimized for detection of a variant form of a precharacterized polymorphism. Such a subarray contains probes designed to be complementary to a second reference sequence, which is an allelic variant of the first reference sequence. The second group of probes is designed by the same principles as described in the Examples, except that the probes exhibit complementarity to the second reference sequence. The inclusion of a second group (or further groups) can be particularly useful for analyzing short subsequences of the primary reference sequence in which multiple mutations are expected to occur within a short distance commensurate with the length of the probes (e.g., two or more mutations within 9 to 21 bases).

3. Allele-Specific Primers

An allele-specific primer hybridizes to a site on target DNA overlapping a polymorphism and only primes amplification of an allelic form to which the primer exhibits perfect complementarity. See Gibbs, *Nucleic Acid Res.* 17, 2427-2448 (1989). This primer is used in conjunction with a second primer which hybridizes at a distal site. Amplification proceeds from the two primers, resulting in a detectable product which indicates the particular allelic form is present. A control is usually performed with a second pair of primers, one of which shows a single base mismatch at the polymorphic site and the other of which exhibits perfect complementarity to a distal site. The single-base mismatch prevents amplification and no detectable product is formed. The method works best when the mismatch is included in the 3'-most position of the oligonucleotide aligned with the polymorphism because this position is most destabilizing to elongation from the primer (see, e.g., WO 93/22456).

4. Direct-Sequencing

The direct analysis of the sequence of polymorphisms of the present invention can be accomplished using either the dideoxy chain termination method or the Maxam Gilbert method (see Sambrook *et al.*, *Molecular Cloning, A Laboratory Manual* (2nd Ed., CSHP, New York 1989); Zyskind *et al.*, *Recombinant DNA Laboratory Manual*, (Acad. Press, 1988)).

5. Denaturing Gradient Gel Electrophoresis

Amplification products generated using the polymerase chain reaction can be analyzed by the use of denaturing gradient gel electrophoresis. Different alleles can be identified based on the different sequence-dependent melting properties and electrophoretic migration of DNA in solution. Erlich, ed., *PCR Technology, Principles and Applications for DNA Amplification*, (W.H. Freeman and Co, New York, 1992), Chapter 7.

6. Single-Strand Conformation Polymorphism Analysis

Alleles of target sequences can be differentiated using single-strand conformation polymorphism analysis, which identifies base differences by alteration in electrophoretic migration of single stranded PCR products, as described in Orita *et al.*, *Proc. Nat. Acad. Sci.* 86, 2766-2770 (1989). Amplified PCR products can be generated as described above, and heated or otherwise denatured, to form single stranded amplification products. Single-stranded nucleic acids may refold or form secondary structures which are partially dependent on the base sequence. The different electrophoretic mobilities of single-stranded amplification products can be related to base-sequence differences between alleles of target sequences.

II. Methods of Use

After determining polymorphic form(s) present in an individual at one or more polymorphic sites, this information can be used in a number of methods.

A. Forensics

Determination of which polymorphic forms occupy a set of polymorphic sites in an individual identifies a set of polymorphic forms that distinguishes the individual. *See generally* National Research Council, *The Evaluation of Forensic DNA Evidence* (Eds. Pollard *et al.*, National Academy Press, DC, 1996). The more sites that are analyzed, the lower the probability that the set of polymorphic forms in one individual is the same as that in an unrelated individual. Preferably, if multiple sites are analyzed, the sites are unlinked. Thus, polymorphisms of the invention are often used in conjunction with polymorphisms in distal genes. Preferred polymorphisms for use in forensics are biallelic because the population frequencies of two polymorphic forms can usually be determined with greater accuracy than those of multiple polymorphic forms at multi-allelic loci.

The capacity to identify a distinguishing or unique set of forensic markers in an individual is useful for forensic analysis. For example, one can determine whether a blood sample from a suspect matches a blood or other tissue sample from a crime scene by determining whether the set of polymorphic forms occupying selected polymorphic sites is the same in the suspect and the sample. If the set of polymorphic markers does not match between a suspect and a sample, it can be concluded (barring experimental error) that the suspect was not the source of the sample. If the set of markers does match, one can conclude that the DNA from the suspect is consistent with that found at the crime scene. If frequencies of the polymorphic forms at the loci tested have been determined (e.g., by analysis of a suitable population of individuals), one can perform a statistical analysis to determine the probability that a match of suspect and crime scene sample would occur by chance.

p(ID) is the probability that two random individuals have the same polymorphic or allelic form at a given polymorphic site. In biallelic loci, four genotypes are possible: AA, AB, BA, and BB. If alleles A and B occur in a haploid genome of the organism with frequencies x and y, the probability of each genotype in a diploid organism is (see WO 95/12607):

Homozygote: $p(AA)= x^2$
Homozygote: $p(BB)= y^2 = (1-x)^2$

Single Heterozygote: $p(AB) = p(BA) = xy = x(1-x)$
Both Heterozygotes: $p(AB+BA) = 2xy = 2x(1-x)$

The probability of identity at one locus (i.e, the probability that two individuals, picked at random from a population will have identical polymorphic forms at a given locus) is given by the equation:

$$p(ID) = (x^2)^2 + (2xy)^2 + (y^2)^2.$$

These calculations can be extended for any number of polymorphic forms at a given locus. For example, the probability of identity p(ID) for a 3-allele system where the alleles have the frequencies in the population of x, y and z, respectively, is equal to the sum of the squares of the genotype frequencies:

$$p(ID) = x^4 + (2xy)^2 + (2yz)^2 + (2xz)^2 + z^4 + y^4$$

In a locus of n alleles, the appropriate binomial expansion is used to calculate p(ID) and p(exc).

The cumulative probability of identity (cum p(ID)) for each of multiple unlinked loci is determined by multiplying the probabilities provided by each locus.

$$\text{cum } p(ID) = p(ID1)p(ID2)p(ID3)\ldots.\ p(IDn)$$

The cumulative probability of non-identity for n loci (i.e. the probability that two random individuals will be different at 1 or more loci) is given by the equation:

$$\text{cum } p(nonID) = 1\text{-cum } p(ID).$$

If several polymorphic loci are tested, the cumulative probability of non-identity for random individuals becomes very high (e.g., one billion to one). Such probabilities can be taken into account together with other evidence in determining the guilt or innocence of the suspect.

B. Paternity Testing

The object of paternity testing is usually to determine whether a male is the father of a child. In most cases, the mother of the child is known and thus, the mother's contribution to the child's genotype can be traced. Paternity testing investigates whether the part of the child's genotype not attributable to the mother is consistent with that of the putative father. Paternity testing can be performed by analyzing sets of polymorphisms in the putative father and the child.

If the set of polymorphisms in the child attributable to the father does not match the set of polymorphisms of the putative father, it can be concluded, barring experimental error, that the putative father is not the real father. If the set of polymorphisms in the child attributable to the father does match the set of polymorphisms of the putative father, a statistical calculation can be performed to determine the probability of coincidental match.

The probability of parentage exclusion (representing the probability that a random male will have a polymorphic form at a given polymorphic site that makes him incompatible as the father) is given by the equation (see WO 95/12607):

$$p(exc) = xy(1-xy)$$

where x and y are the population frequencies of alleles A and B of a biallelic polymorphic site.

(At a triallelic site $p(exc) = xy(1-xy) + yz(1-yz) + xz(1-xz) + 3xyz(1-xyz)))$, where x, y and z and the respective population frequencies of alleles A, B and C).

The probability of non-exclusion is

$$p(\text{non-exc}) = 1-p(exc)$$

The cumulative probability of non-exclusion (representing the value obtained when n loci are used) is thus:

$$\text{cum } p(\text{non-exc}) = p(\text{non-exc}1)p(\text{non-exc}2)p(\text{non-exc}3)\ldots.\ p(\text{non-exc}n)$$

The cumulative probability of exclusion for n loci (representing the probability that a random male will be excluded)

$$\text{cum } p(exc) = 1 - \text{cum } p(\text{non-exc}).$$

If several polymorphic loci are included in the analysis, the cumulative probability of exclusion of a random male is very high. This probability can be taken into account in assessing the liability of a putative father whose polymorphic marker set matches the child's polymorphic marker set attributable to his/her father.

C. Correlation of Polymorphisms with Phenotypic Traits

The polymorphisms of the invention may contribute to the phenotype of an organism in different ways. Some polymorphisms occur within a protein coding sequence and contribute to phenotype by affecting protein structure. The effect may be neutral, beneficial or detrimental, or both beneficial and detrimental, depending

on the circumstances. For example, a heterozygous sickle cell mutation confers resistance to malaria, but a homozygous sickle cell mutation is usually lethal. Other polymorphisms occur in noncoding regions but may exert phenotypic effects indirectly via influence on replication, transcription, and translation. A single polymorphism may affect more than one phenotypic trait. Likewise, a single phenotypic trait may be affected by polymorphisms in different genes. Further, some polymorphisms predispose an individual to a distinct mutation that is causally related to a certain phenotype.

Phenotypic traits include diseases that have known but hitherto unmapped genetic components. Phenotypic traits also include symptoms of, or susceptibility to, multifactorial diseases of which a component is or may be genetic, such as autoimmune diseases, inflammation, cancer, diseases of the nervous system, and infection by pathogenic microorganisms. Some examples of diseases which can be treated or diagnosed as described herein include, but are not limited to, bradyarrhythmias, tachyarrhythmias, heart failure, such as congestive heart failure, congenital heart disease, rheumatic fever, valvular heart disease, cardiomyopathies, myocarditides, pericardial diseases, cardiac tumors, cardiac manifestations of systemic diseases, and traumatic cardiac injury. Other disorders include atherosclerosis, acute myocardial infarction, ischemic heart disease, hypertensive vascular disease, disorders of the aorta, vascular diseases of the extremities, vessel wall disorders, such as various forms of thrombocytopenia, von Willebrand's disease and drug-induced platelet dysfunction, and homeostatic disorders relating to vessel disease and associated bleeding. Also suitable are thrombotic thrombocytopenic purpura, hemolytic-uremic syndrome, Henoch-Schönlein purpura, capillary fragility, vascular purpura, metabolic and inflammatory disorders, such as those induced by rickettsiae and certain drugs, such as sulfonamides, aortic aneurysm, aortic dissection, aortic occlusion, aortitis, atherosclerosis, coronary artery disease, angina, myocardial infarction, thrombosis, hemostatic and coagulation disorders, hypertension and hypotension. Other disorders include transplant accelerated vascular restenosis following balloon angioplasty, Raynaud's disease and acrocyanosis.

Additional disorders include, but are not limited to, disorders of neurodegeneration characterized by astrocyte hypertrophy including gliosis, Pick's disease, aceroplasminemia, portal-systemic encephalopathy, frontal lobe dementia and inherited and acquired ataxias, neurodegenerative diseases of other etiology including progressive supranuclear palsy, primary progressive aphasia, cortical basal degeneration, Alzheimer's disease, Huntington's disease, and Parkinson's disease, retinitis pigmentosa and amylotrophic lateral sclerosis. Other disorders include epilepsy, stroke, defects of neural migration and differentiation, including Miller-Dieker lissencephaly syndrome, and cancer of the brain including astrocytomas and gliomas, as well as psychological disorders such as schizophrenia.

Phenotypic traits also include characteristics such as longevity, appearance (e.g., baldness, obesity), strength, speed, endurance, fertility, and susceptibility or receptivity to particular drugs or therapeutic treatments.

The correlation of one or more polymorphisms with phenotypic traits can be facilitated by knowledge of the gene product of the wild type (reference) gene. The genes in which cSNPs of the present invention have been identified are genes which have been previously sequenced and characterized in one of their allelic forms.

Correlation is performed for a population of individuals who have been tested for the presence or absence of a phenotypic trait of interest and for polymorphic markers sets. To perform such analysis, the presence or absence of a set of polymorphisms (i.e. a polymorphic set) is determined for a set of the individuals, some of whom exhibit a particular trait, and some of which exhibit lack of the trait. The alleles of each polymorphism of the set are then reviewed to determine whether the presence or absence of a particular allele is associated with the trait of interest. Correlation can be performed by standard statistical methods such as a κ-squared test and statistically significant correlations between polymorphic form(s) and phenotypic characteristics are noted. For example, it might be found that the presence of allele A1 at polymorphism A correlates with heart disease. As a further example, it might be found that the combined presence of allele A1 at polymorphism A and allele B1 at polymorphism B correlates with increased milk production of a farm animal.

Such correlations can be exploited in several ways. In the case of a strong correlation between a set of one or more polymorphic forms and a disease for which treatment is available, detection of the polymorphic form set in a human or animal patient may justify immediate administration of treatment, or at least the institution of regular monitoring of the patient. Detection of a polymorphic form correlated with serious disease in a couple contemplating a family may also be valuable to the couple in their reproductive decisions. For example, the female partner might elect to undergo in vitro fertilization to avoid the possibility of transmitting such a polymorphism from her husband to her offspring. In the case of a weaker, but still statistically significant correlation between a polymorphic set and human disease, immediate therapeutic intervention or monitoring may not be justified. Nevertheless, the patient can be motivated to begin simple life-style changes (e.g., diet, exercise) that can be accomplished at little cost to the patient but confer potential benefits in reducing the risk of conditions to which the patient may have increased susceptibility by virtue of variant alleles. Identification of a polymorphic set in a patient correlated with enhanced receptiveness to one of several treatment regimes for a disease indicates that this treatment regime should be followed.

For animals and plants, correlations between characteristics and phenotype are useful for breeding for desired characteristics. For example, Beitz *et al.*, US 5,292,639 discuss use of bovine mitochondrial polymorphisms in a breeding program to improve milk production in cows. To evaluate the effect of mtDNA D-loop sequence polymorphism on milk production, each cow was assigned a value of 1 if variant or 0 if wildtype with respect to a prototypical mitochondrial DNA sequence at each of 17 locations considered. Each production trait was analyzed individually with the following animal model:

$$Y_{ijkpn} = \mu + YS_i + P_j + X_k + \beta_1 + \ldots \beta_{17} + PE_n + a_n + e_p$$

where Y_{ijknp} is the milk, fat, fat percentage, SNF, SNF percentage, energy concentration, or lactation energy record; μ is an overall mean; YS_i is the effect common to all cows calving in year-season; X_k is the effect common to cows in either the high or average selection line; β_1 to β_{17} are the binomial regressions of production record on mtDNA D-loop sequence polymorphisms; PE_n is permanent environmental effect common to all records of cow n; a_n is effect of animal n and is

composed of the additive genetic contribution of sire and dam breeding values and a Mendelian sampling effect; and e_p is a random residual. It was found that eleven of seventeen polymorphisms tested influenced at least one production trait. Bovines having the best polymorphic forms for milk production at these eleven loci are used as parents for breeding the next generation of the herd.

D. Genetic Mapping of Phenotypic Traits

The previous section concerns identifying correlations between phenotypic traits and polymorphisms that directly or indirectly contribute to those traits. The present section describes identification of a physical linkage between a genetic locus associated with a trait of interest and polymorphic markers that are not associated with the trait, but are in physical proximity with the genetic locus responsible for the trait and co-segregate with it. Such analysis is useful for mapping a genetic locus associated with a phenotypic trait to a chromosomal position, and thereby cloning gene(s) responsible for the trait. *See* Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 83, 7353-7357 (1986); Lander *et al.*, *Proc. Natl. Acad. Sci. (USA)* 84, 2363-2367 (1987); Donis-Keller *et al.*, *Cell* 51, 319-337 (1987); Lander *et al.*, *Genetics* 121, 185-199 (1989)). Genes localized by linkage can be cloned by a process known as directional cloning. *See* Wainwright, *Med. J. Australia* 159, 170-174 (1993); Collins, *Nature Genetics* 1, 3-6 (1992).

Linkage studies are typically performed on members of a family. Available members of the family are characterized for the presence or absence of a phenotypic trait and for a set of polymorphic markers. The distribution of polymorphic markers in an informative meiosis is then analyzed to determine which polymorphic markers co-segregate with a phenotypic trait. *See, e.g.*, Kerem *et al.*, *Science* 245, 1073-1080 (1989); Monaco *et al.*, *Nature* 316, 842 (1985); Yamoka *et al.*, *Neurology* 40, 222-226 (1990); Rossiter *et al.*, *FASEB Journal* 5, 21-27 (1991).

Linkage is analyzed by calculation of LOD (log of the odds) values. A lod value is the relative likelihood of obtaining observed segregation data for a marker and a genetic locus when the two are located at a recombination fraction θ, versus the situation in which the two are not linked, and thus segregating independently (Thompson & Thompson, *Genetics in Medicine* (5th ed, W.B. Saunders Company,

Philadelphia, 1991); Strachan, "Mapping the human genome" in *The Human Genome* (BIOS Scientific Publishers Ltd, Oxford), Chapter 4). A series of likelihood ratios are calculated at various recombination fractions (θ), ranging from $\theta = 0.0$ (coincident loci) to $\theta = 0.50$ (unlinked). Thus, the likelihood at a given value of θ is: probability of data if loci linked at θ to probability of data if loci unlinked. The computed likelihoods are usually expressed as the $\log_{10}$ of this ratio (i.e., a lod score). For example, a lod score of 3 indicates 1000:1 odds against an apparent observed linkage being a coincidence. The use of logarithms allows data collected from different families to be combined by simple addition. Computer programs are available for the calculation of lod scores for differing values of θ (e.g., LIPED, MLINK (Lathrop, *Proc. Nat. Acad. Sci. (USA)* 81, 3443-3446 (1984)). For any particular lod score, a recombination fraction may be determined from mathematical tables. *See* Smith *et al.*, *Mathematical tables for research workers in human genetics* (Churchill, London, 1961); Smith, *Ann. Hum. Genet.* 32, 127-150 (1968). The value of θ at which the lod score is the highest is considered to be the best estimate of the recombination fraction.

Positive lod score values suggest that the two loci are linked, whereas negative values suggest that linkage is less likely (at that value of θ) than the possibility that the two loci are unlinked. By convention, a combined lod score of +3 or greater (equivalent to greater than 1000:1 odds in favor of linkage) is considered definitive evidence that two loci are linked. Similarly, by convention, a negative lod score of -2 or less is taken as definitive evidence against linkage of the two loci being compared. Negative linkage data are useful in excluding a chromosome or a segment thereof from consideration. The search focuses on the remaining non-excluded chromosomal locations.

III. Modified Polypeptides and Gene Sequences

The invention further provides variant forms of nucleic acids and corresponding proteins. The nucleic acids comprise one of the sequences described in Figures 5A-5QQQQQQQ, column 11, in which the polymorphic position is occupied by one of the alternative bases for that position. Some nucleic acids encode full-length variant forms of proteins. Similarly, variant proteins have the

prototypical amino acid sequences encoded by nucleic acid sequences shown in Figures 5A-5QQQQQQQ, column 11, (read so as to be in-frame with the full-length coding sequence of which it is a component) except at an amino acid encoded by a codon including one of the polymorphic positions shown in Figures 5A-5QQQQQQQ. That position is occupied by the amino acid coded by the corresponding codon in any of the alternative forms shown in Figures 5A-5QQQQQQQ.

Variant genes can be expressed in an expression vector in which a variant gene is operably linked to a native or other promoter. Usually, the promoter is a eukaryotic promoter for expression in a mammalian cell. The transcription regulation sequences typically include a heterologous promoter and optionally an enhancer which is recognized by the host. The selection of an appropriate promoter, for example trp, lac, phage promoters, glycolytic enzyme promoters and tRNA promoters, depends on the host selected. Commercially available expression vectors can be used. Vectors can include host-recognized replication systems, amplifiable genes, selectable markers, host sequences useful for insertion into the host genome, and the like.

The means of introducing the expression construct into a host cell varies depending upon the particular construction and the target host. Suitable means include fusion, conjugation, transfection, transduction, electroporation or injection, as described in Sambrook, *supra*. A wide variety of host cells can be employed for expression of the variant gene, both prokaryotic and eukaryotic. Suitable host cells include bacteria such as *E. coli*, yeast, filamentous fungi, insect cells, mammalian cells, typically immortalized, *e.g.*, mouse, CHO, human and monkey cell lines and derivatives thereof. Preferred host cells are able to process the variant gene product to produce an appropriate mature polypeptide. Processing includes glycosylation, ubiquitination, disulfide bond formation, general post-translational modification, and the like.

The protein may be isolated by conventional means of protein biochemistry and purification to obtain a substantially pure product, *i.e.*, 80, 95 or 99% free of cell component contaminants, as described in Jacoby, *Methods in Enzymology* Volume 104, Academic Press, New York (1984); Scopes, *Protein Purification, Principles*

and Practice, 2nd Edition, Springer-Verlag, New York (1987); and Deutscher (ed), *Guide to Protein Purification, Methods in Enzymology,* Vol. 182 (1990). If the protein is secreted, it can be isolated from the supernatant in which the host cell is grown. If not secreted, the protein can be isolated from a lysate of the host cells.

The invention further provides transgenic nonhuman animals capable of expressing an exogenous variant gene and/or having one or both alleles of an endogenous variant gene inactivated. Expression of an exogenous variant gene is usually achieved by operably linking the gene to a promoter and optionally an enhancer, and microinjecting the construct into a zygote. *See* Hogan *et al.*, "Manipulating the Mouse Embryo, A Laboratory Manual," Cold Spring Harbor Laboratory. Inactivation of endogenous variant genes can be achieved by forming a transgene in which a cloned variant gene is inactivated by insertion of a positive selection marker. *See* Capecchi, *Science* 244, 1288-1292 (1989). The transgene is then introduced into an embryonic stem cell, where it undergoes homologous recombination with an endogenous variant gene. Mice and other rodents are preferred animals. Such animals provide useful drug screening systems.

In addition to substantially full-length polypeptides expressed by variant genes, the present invention includes biologically active fragments of the polypeptides, or analogs thereof, including organic molecules which simulate the interactions of the peptides. Biologically active fragments include any portion of the full-length polypeptide which confers a biological function on the variant gene product, including ligand binding, and antibody binding. Ligand binding includes binding by nucleic acids, proteins or polypeptides, small biologically active molecules, or large cellular structures.

Polyclonal and/or monoclonal antibodies that specifically bind to variant gene products but not to corresponding prototypical gene products are also provided. Antibodies can be made by injecting mice or other animals with the variant gene product or synthetic peptide fragments thereof. Monoclonal antibodies are screened as are described, for example, in Harlow & Lane, *Antibodies, A Laboratory Manual*, Cold Spring Harbor Press, New York (1988); Goding, *Monoclonal antibodies, Principles and Practice* (2d ed.) Academic Press, New York (1986). Monoclonal antibodies are tested for specific immunoreactivity with a variant gene product and

lack of immunoreactivity to the corresponding prototypical gene product. These antibodies are useful in diagnostic assays for detection of the variant form, or as an active ingredient in a pharmaceutical composition.

IV. Kits

The invention further provides kits comprising at least one allele-specific oligonucleotide as described above. Often, the kits contain one or more pairs of allele-specific oligonucleotides hybridizing to different forms of a polymorphism. In some kits, the allele-specific oligonucleotides are provided immobilized to a substrate. For example, the same substrate can comprise allele-specific oligonucleotide probes for detecting at least 10, 100 or all of the polymorphisms shown in Figures 5A-5QQQQQQQ. Optional additional components of the kit include, for example, restriction enzymes, reverse-transcriptase or polymerase, the substrate nucleoside triphosphates, means used to label (for example, an avidin-enzyme conjugate and enzyme substrate and chromogen if the label is biotin), and the appropriate buffers for reverse transcription, PCR, or hybridization reactions. Usually, the kit also contains instructions for carrying out the methods.

From the foregoing, it is apparent that the invention includes a number of general uses that can be expressed concisely as follows. The invention provides for the use of any of the nucleic acid segments described above in the diagnosis or monitoring of diseases, such as coronary artery disease, diabetes, coagulation disorders, lipid metabolism disorders, energy metabolism disorders, diseases of the blood, blood vessels and cardiovascular system, and infection by microorganisms, as well as psychological disorders (e.g., bipolar disorder, psychiophrenia). The invention further provides for the use of any of the nucleic acid segments in the manufacture of a medicament for the treatment or prophylaxis of such diseases. The invention further provides for the use of any of the DNA segments as a pharmaceutical.

While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without

departing from the spirit and scope of the invention as defined by the appended claims.

CLAIMS

What is claimed is:

1. A nucleic acid molecule selected from the group consisting of the genes listed in Figures 5A-5QQQQQQQ, wherein said nucleic acid molecule is at least 5 nucleotides in length and comprises a polymorphic site identified in Figures 5A-5QQQQQQQ, wherein a nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.

2. A nucleic acid molecule according to Claim 1, wherein said nucleic acid molecule is at least 10 nucleotides in length.

3. A nucleic acid molecule according to Claim 1, wherein said nucleic acid molecule is at least 20 nucleotides in length.

4. A nucleic acid molecule according to Claim 1, wherein the nucleotide at the polymorphic site is the variant nucleotide for the gene listed in Figures 5A-5QQQQQQQ.

5. An allele-specific oligonucleotide that hybridizes to a portion of a gene selected from the group consisting of the genes listed in Figures 5A-5QQQQQQQ, wherein said portion is at least 5 nucleotides in length and comprises a polymorphic site identified in Figures 5A-5QQQQQQQ, wherein a nucleotide at the polymorphic site is different from a nucleotide at the polymorphic site in a corresponding reference allele.

6. An allele-specific oligonucleotide according to Claim 5 that is a probe.

7. An allele-specific oligonucleotide according to Claim 5, wherein a central position of the probe aligns with the polymorphic site of the portion.

8. An allele-specific oligonucleotide according to Claim 5 that is a primer.

9. An allele-specific oligonucleotide according to Claim 8, wherein the 3' end of the primer aligns with the polymorphic site of the portion.

10. An isolated gene product encoded by a nucleic acid molecule according to Claim 1.

11. A method of analyzing a nucleic acid sample, comprising obtaining the nucleic acid from an individual sample; and determining a base occupying any one of the polymorphic sites shown in Figures 5A-5QQQQQQQ.

12. A method according to Claim 11, wherein the nucleic acid sample is obtained from a plurality of individuals, and a base occupying one of the polymorphic positions is determined in each of the individuals, and the method further comprising testing each individual for the presence of a disease phenotype, and correlating the presence of the disease phenotype with the base.

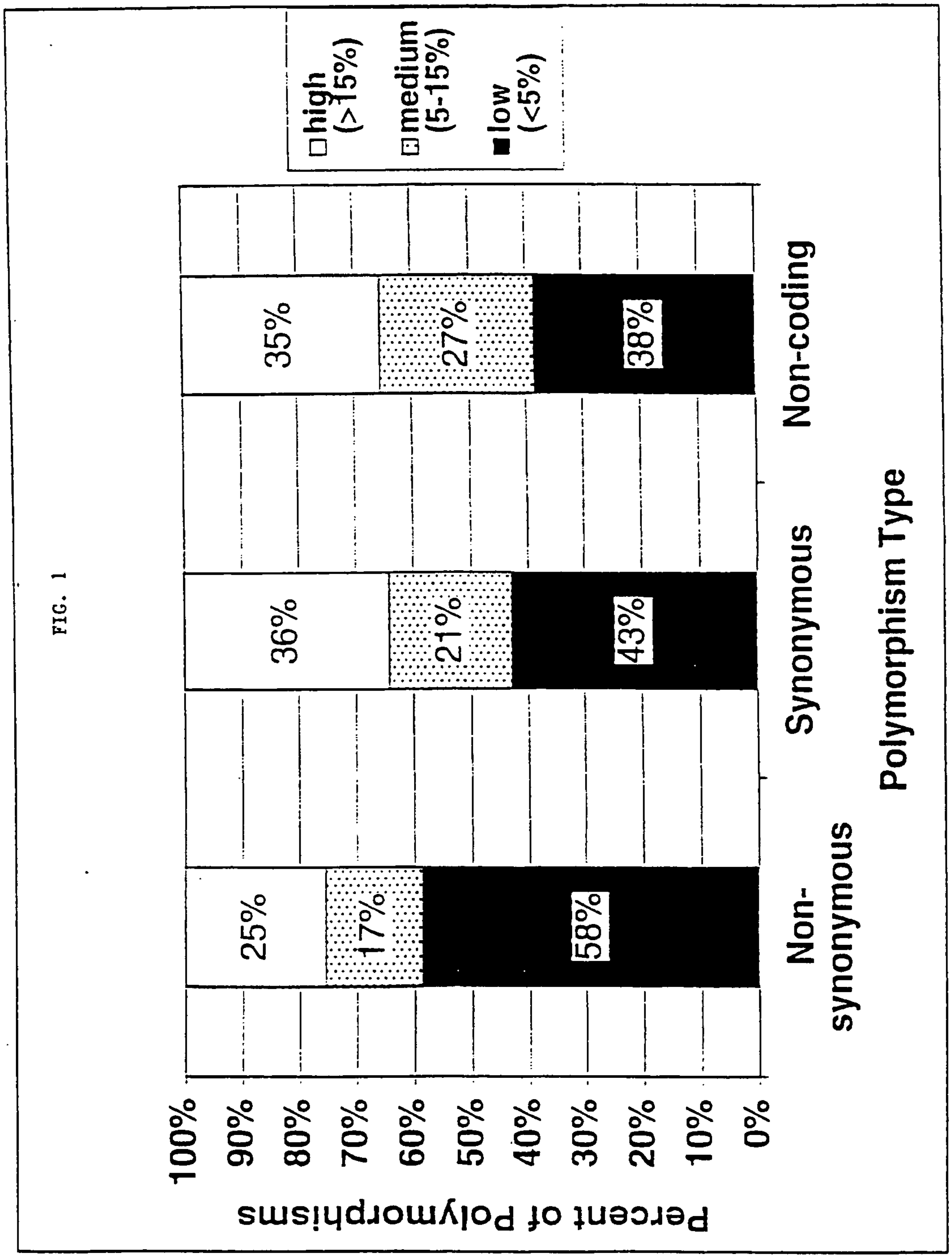
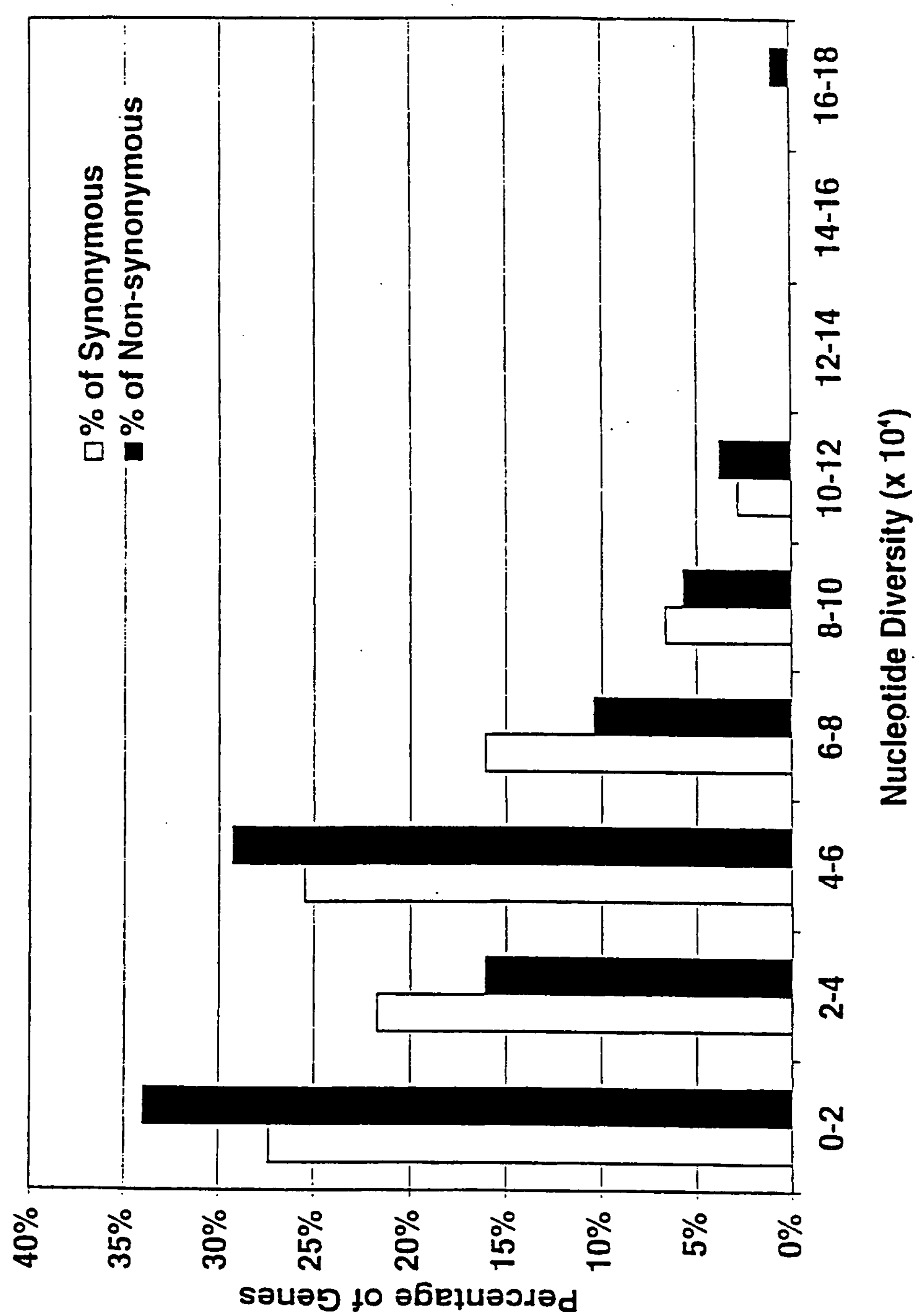

high (>15%)
medium (5-15%)
low (<5%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent of Polymorphisms
25%
17%
58%
36%
21%
43%
35%
27%
38%
Non-synonymous
Synonymous
Non-coding
Polymorphism Type

FIG. 1

FIG. 2


☐ % of Synonymous
■ % of Non-synonymous
Percentage of Genes
40%
35%
30%
25%
20%
15%
10%
5%
0%
0-2
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
Nucleotide Diversity (x 10⁴)

Gene	coding bp screened	No. Synonymous polymorphisms	No. Non-synonymous polymorphisms	Non-coding bp screened	No. Non-coding polymorphisms
AADC	1229	0	2	311	0
ADORA2	332	0	1	75	0
AHC	1413	0	0	63	1
ANX3	929	2	4	725	6
APOD	570	1	3	383	1
AR	2759	3	1	300	0
AT3	1357	3	0	121	0
BDNF	744	0	1	212	0
CD36	1209	1	1	252	0
CETP	1397	4	4	299	0
CGA	349	1	0	235	0
CLanalog	1461	3	2	12	0
CNTF	603	0	1	154	0
COMT	783	2	1	241	1
CRH	51	0	0	745	3
CYP11A	1556	1	1	547	0
CYP11B1	1410	7	7	496	9
CYP11B2	1512	7	8	906	4
CYP17	1395	3	0	36	0
CYP21	1488	5	11	542	7
DBH	1266	0	2	49	0
DRD1	1341	1	0	81	0
DRD2	1032	2	0	1379	3
DRD3	719	0	1	145	0
DRD5	1408	2	1	34	0
F10	1369	3	2	416	1
F11	1878	7	4	1312	2
F13A1	2199	3	6	948	4
F13B	1952	4	6	2339	4
F2	1740	3	2	292	0
F2R	1202	2	1	13	0
F3	875	0	1	92	0
F5	6564	13	16	1542	8
F7	1262	4	2	1209	2
F9	1364	0	1	1062	2
FGA	1935	2	2	490	0
FGB	1476	7	3	1057	0
FGG	1252	0	2	1392	2
FSH	355	1	1	44	0
FSHR	1683	1	3	0	0
GABRB1	1425	5	0	804	2
GAP43	675	1	1	79	0
GH1	644	0	1	426	5
GHR	1765	1	6	391	1
GNRHR	237	0	1	513	0
GP1BA	1881	2	2	48	0
GP1BB	1238	0	0	73	0
GP5	1683	0	0	52	0
GP9	534	1	0	143	0
GRF	224	0	0	239	0
GRIN1	1681	1	0	553	0
GRL	2334	4	3	4028	5
HCF2	1500	3	3	64	1

FIG. 3A

Gene	coding bp screened	No. Synonymous polymorphisms	No. Non-synonymous polymorphisms	Non-coding bp screened	No. Non-coding polymorphisms
HMGCR	1724	0	1	12	1
HSD3B1	1122	3	2	653	1
HSD3B2	1122	1	1	723	2
HTR1A	1272	1	0	1189	1
HTR1D	1134	1	1	46	0
HTR1DB	1173	2	0	85	1
HTR1E	1098	1	1	70	0
HTR1EL	1101	1	0	46	0
HTR2A	1398	2	3	1709	9
HTR2C	1245	0	1	138	0
HTR5A	1062	2	0	34	0
HTR6	437	1	0	34	0
HTR7	1279	0	0	138	0
IGF1	630	0	0	7250	8
IGF2	546	0	0	610	1
ITGA2B	2833	4	3	707	0
ITGB3	2131	4	3	163	0
KLK2	297	0	1	279	2
LCAT	1289	1	2	90	0
LDLR	2101	7	3	38	0
LIPC	1471	4	3	754	4
LPL	409	1	1	48	0
MAOA	1032	1	0	69	0
MAOB	980	1	0	135	0
MPL	1748	1	2	903	1
NGFB	726	1	1	1186	5
NOS1	127	0	0	56	0
NT3	774	1	0	150	0
NTRK1	1961	5	2	1106	0
PACE	1500	2	0	1095	4
PAI1	1171	1	2	911	1
PAI2	1248	5	4	915	5
PC1	1881	1	3	456	1
PCI	1221	5	5	576	4
POMC	132	0	0	520	0
PRL	633	1	1	180	1
PROC	1334	3	0	114	0
PROS1	1868	1	0	557	0
PTAFR	1029	0	2	13	0
PTH	348	1	0	230	2
PTHLH	634	0	0	2342	13
SELP	2096	5	8	14	0
SHBG	1209	1	3	494	1
SLC6A1	1388	2	0	547	2
SLC6A3	1496	6	1	205	0
SLC6A4	1623	1	2	824	1
TBXA2R	1006	1	0	12	0
TBXAS1	1605	1	6	1411	1
TFPI	806	0	1	139	0
TH	965	1	1	104	0
THBD	1728	0	0	26	0
THPO	1049	0	0	632	2
VLDLR	2391	3	1	850	2
ALL GENES	135823	203	192	59552	150

FIG. 3B

Polymorphism rates for different classes of sites. Nucleotide diversity and heterozygosity (π) are expressed x 10^4.

						Adjusted for frequency of sites*		
Polymorphism Type	bp screened	No. polys	Frequency (SNP/bp)	$\hat{\theta}$	π	Frequency (SNP/bp)	$\hat{\theta}$	π
Non-coding	59,552	150	1/397	4.93 ± 1.24	5.05 ± 2.40			
Coding	135,823	395	1/344	5.47 ± 1.32	5.07 ± 2.40			
synonymous		203	1/669	2.81 ± 0.68	2.98 ± 1.42	1/191	9.84 ± 2.38	10.43 ± 4.97
non-synonymous		192	1/707	2.66 ± 0.64	2.06 ± 0.98	1/504	3.73 ± 0.90	2.89 ± 1.37
conservative		122	1/1113	1.69 ± 0.41	1.44 ± 0.68	1/389	4.94 ± 1.19	4.21 ± 1.99
non-conservative		70	1/1940	0.97 ± 0.23	0.63 ± 0.30	1/705	2.61 ± 0.63	1.70 ± 0.81
four-fold degenerate sites	21,645	111	1/195	9.64 ± 2.32	9.26 ± 4.40			
two-fold degenerate sites	34,294	125	1/274	6.85 ± 1.65	5.33 ± 2.53			
non-degenerate sites	79,659	157	1/507	3.70 ± 0.89	2.52 ± 1.19			
Total	195,375	545	1/357	5.31 ± 1.28	5.01 ± 2.38			

* The number of synonymous sites was calculated as the sum of four-fold degenerate sites and half the number of two-fold degenerate sites; the number of non-synonymous sites is the sum of the non-degenerate sites and half the two-fold degenerate sites. The number of conservative and non-conservative sites is estimated as the proportion of non-synonymous sites at which a nucleotide substitution would create a conservative or non-conservative substitution, calculated as in footnote 21.

FIG. 4

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
AADCd4	AADC	C	T	P	L	cds	GE1048	CACACACCTGT ACAAATCCAA	CTTACAAAGAA AGGAATCAGGC	CACACACCTGTACAAATCCAActctgctgtcttctttccaggcacactcctcagtggaaagagct gggttaattggtggagtgaaattaaaagccatcc[c/t]ctcagatggcaacttcgccatgcgtg cgtctgccctgcaggaagccctggagagagacaaagcggctgGCCTGATTCCTTTCTTTGTAAG	194
AADCd5	AADC	A	G	M	V	cds	GE1048	CACACACCTGT ACAAATCCAA	CTTACAAAGAA AGGAATCAGGC	CACACACCTGTACAAATCCAActctgctgtcttctttccaggcacactcctcagtggaaagagct gggttaattggtggagtgaaattaaaagccatcccctcagatggcaacttcgcc[a/g]tgcgtg cgtctgccctgcaggaagccctggagagagacaaagcggctgGCCTGATTCCTTTCTTTGTAAG	194
AADCd6	AADC	G	A	V	M	cds	GE1094	CACTGAATCAT TTTCTTTCTGC	ACACACTTACC CCAGGC	CACTGAATCATTTTCTTTCTGCagttttcacctctgacagagcccagacaccatgaacgcaagtg aattccgaaggagagggaaggagatggtggattac[g/a]tggccaactacatggaaggcattga gggacgccaggtctaccctgacgtggagcccgggtacctgcggccgctgatccctgccgctgccc ctcaggagccagacacgtttgaggacatcatcaacgacgttgagaagataatcatGCCTGGGGTA AGTGTGT	267
AADCd7	AADC	C	T	D	D	cds	GE1263	CCCTTGTTACT GCTGACCCC	CACTCCTCCCC CTTCTC	CCCTTGTTACTGCTGACCCCcaaatttatgcaatgctnggccctctggataatccattcccttcc cccacgacaggcggcaagcccagcatgcacagagctggagactgtgatgatgga[c/t]tggctc gggaagatgctggaactaccaaaggcattttgaatgagaaagctgGAGAAGGGGGAGGAGTG	193
AADCu1	AADC	C	T	R	W	cds	GE1094	CACTGAATCAT TTTCTTTCTGC	ACACACTTACC CCAGGC	CACTGAATCATTTTCTTTCTGCagttttcacctctgacagagcccagacaccatgaacgcaagtg aattccgaaggagagggaaggagatggtggattacgtggccaactacatggaaggcattgaggga cgccaggtctaccctgacgtggagcccgggtacctg[c/t]ggccgctgatccctgccgctgccc ctcaggagccagacacgtttgaggacatcatcaacgacgttgagaagataatcatGCCTGGGGTA AGTGTGT	267
AADCu2	AADC	A	G	E	G	cds	GE1094	CACTGAATCAT TTTCTTTCTGC	ACACACTTACC CCAGGC	CACTGAATCATTTTCTTTCTGCagttttcacctctgacagagcccagacaccatgaacgcaagtg aattccgaaggagagggaaggagatggtggattacgtggccaactacatggaaggcattgaggga cgccaggtctaccctgacgtggagcccgggtacctgcggccgctgatccctgccgctgcccctca ggagccagacacgtttg[a/g]ggacatcatcaacgacgttgagaagataatcatGCCTGGGGTA AGTGTGT	267
AADCu3	AADC	A	T	I	I	cds	GE1004	TCCATCTGGGG ACTCAC	GTGCACCTACC TCCACTC	TCCATCTGGGGACTCACaagttgattctgaactttaggcaacaaggaagacat[a/t]tggctgc acgttgatgcagcctacgcaggcagtgcattcatctgccctgagttccggcaccttctgaatgGA GTGGAGGTAGGTGCAC	146
ADORA2 u1	ADORA 2	C	T	A	V	cds	GE1141	ATGGACCGTGA GCTGGC	AAGCCTGGGCA CCAACA	ATGGACCGTGAGCTGGCccagcccgcgtccgtgctgagcctgcctgtcgtctgtggccatgccca tcatgggctcctcggtgtacatcacggtggagctggccattgctgtgctggccatcctgggcaat gtgctggtgtgctgggccgtgtggctcaacagcaacctgcagaacgtcaccaactactttgtggt gtcactggcgg[c/t]ggccgacatcgcagtgggtgtgctcgccatcccctttgccatcaccatc agcaccgggttctgcgctgcctgccacggctgcctcttcattgcctgcttcgtcctggtcctcac gcagagctccatcttcagtctcctggccatcgccattgaccgctacattgccatccgcatcccgc tccggtgagcagggccggggttacatctgtgcaaaggcTGTTGGTGCCCAGGCTT	445
ADORA2 u2	ADORA 2	C	G	P	P	cds	GE1141	ATGGACCGTGA GCTGGC	AAGCCTGGGCA CCAACA	ATGGACCGTGAGCTGGCccagcccgcgtccgtgctgagcctgcctgtcgtctgtggccatgcc[c /g]atcatgggctcctcggtgtacatcacggtggagctggccattgctgtgctggccatcctggg caatgtgctggtgtgctgggccgtgtggctcaacagcaacctgcagaacgtcaccaactactttg tggtgtcactggcggcggccgacatcgcagtgggtgtgctcgccatcccctttgccatcaccatc agcaccgggttctgcgctgcctgccacggctgcctcttcattgcctgcttcgtcctggtcctcac gcagagctccatcttcagtctcctggccatcgccattgaccgctacattgccatccgcatcccgc tccggtgagcagggccggggttacatctgtgcaaaggcTGTTGGTGCCCAGGCTT	445

FIG. 5A

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
AHCu1	AHC	T	C	C	C	cds	GE1200	CGCTAGGTATAAATAGGTCCCAG	CTGCGGGTGGTCTTCACC	CGCTAGGTATAAATAGGTCCCAGgaggcagccactgggcagaactgggctacgggcgccgcgggc catggcgggccagaaccaccagtggcagggcagcatcctctacaacatgcttatgagcgcgaagc aaacgcgcgcggctcctgaggctccagagacgcggctggtggatcagtg[t/c]tggggctgttc gtgcggcgatgagcccggggtgggcagagaggggctgctgggcgggcggaacgtggcgctcctgt accgctgctgcttttgcggtaaagaccacccacggcagggcagcatcctctacagcatgctgacg agcgcaaagcaaacgtacgcggcaccgaaggcgcccgaggcgacgctgggtccgtgctggggctg ttcgtgcggctctgatcccggggtgggcagagcggggcttccgggtgggcggcccgtggcactcc tgtaccgctgctgcttttgtggtgaagaccacccgcggcagggcagcatcctctacagcttgctc actagctcaaagcaaacgcacgtggctccggcagcgcccgaggcacggccagggggcgcgtggtg ggaccgctcctacttcgcgcagaggccaggggtaaagaggcgctaccaggcgggcgggccacgg cgcttctgtaccgctgctgcttttgcGGTGAAGACCACCCGCAG	694
AHCu2	AHC	G	A	R	R	cds	GE1200	CGCTAGGTATAAATAGGTCCCAG	CTGCGGGTGGTCTTCACC	CGCTAGGTATAAATAGGTCCCAGgaggcagccactgggcagaactgggctacgggcgccgcgggc catggcgggccagaaccaccagtggcagggcagcatcctctacaacatgcttatgagcgcgaagc aaacgcgcgcggctcctgaggctccagagacgcggctggtggatcagtgttggggctgttcgtgc ggcgatgagcccggggtgggcagagaggggctgctgggcgggcggaacgtggcgctcctgtaccg ctgctgcttttgcggtaaagaccacccacggcagggcagcatcctctacagcatgctgacgagcg caaagcaaacgtacgcggcaccgaaggcgcccgaggcgacgctgggtccgtgctggggctgttcg tgcggctctgatcccggggtgggcagagcggggcttccgggtgggcggcccgtggcactcctgta ccgctgctgcttttgtggtgaagaccacccgcggcagggcagcatcctctacagcttgctcacta gctcaaagcaaacgcacgtggctccggcagcgcccgaggcacg[g/a]ccagggggcgcgtggtg ggaccgctcctacttcgcgcagaggccaggggtaaagaggcgctaccaggcgggcgggccacgg cgcttctgtaccgctgctgcttttgcGGTGAAGACCACCCGCAG	694
AHCu3	AHC	C	T	-	-	noncoding	GE643	GGACTCTGTGGTGAGCTGTTTTAT	TTCTTCCCTCATGGTGAACTG	GGACTCTGTGGTGAGCTGTTTTATaacaaagagattttctcc[c/t]tccagacgtgccgggcc tgcagtgcgtgaagtacattcagggactccagtggggaactcagcaaatactcagtgaacacacc aggatgacgcaccaagggccccatgacagattcatcgaacttaatagtaccctttttcctgctgag attcatcaatgccaatgtcattgctgaactgttcttcaggcccatcatcggcacagtcagcatgg atgatatgatgctggaaatgctctgtacaaagatataaagtcatgtgggccacacaagtgcagta gtgCAGTTCACCATGAGGGAAGAA	349
AHCu4	AHC	G	A	P	P	cds	GE1200	CGCTAGGTATAAATAGGTCCCAG	CTGCGGGTGGTCTTCACC	CGCTAGGTATAAATAGGTCCCAGgaggcagccactgggcagaactgggctacgggcgccgcgggc catggcgggccagaaccaccagtggcagggcagcatcctctacaacatgcttatgagcgcgaagc aaacgcgcgcggctcctgaggctccagagacgcggctggtggatcagtgttggggctgttcgtgc ggcgatgagcccggggtgggcagagaggggctgctgggcgggcggaacgtggcgctcctgtaccg ctgctgcttttgcggtaaagaccacccacggcagggcagcatcctctacagcatgctgacgagcg caaagcaaacgtacgcggcaccgaaggcgcccgaggcgacgctgggtccgtgctggggctgttcg tgcggctctgatcccggggtgggcagagcggggcttccgggtgggcggcccgtggcactcctgta ccgctgctgcttttgtggtgaagaccaccc[g/a]cggcagggcagcatcctctacagcttgctc actagctcaaagcaaacgcacgtggctccggcagcgcccgaggcacggccagggggcgcgtggtg ggaccgctcctacttcgcgcagaggccaggggtaaagaggcgctaccaggcgggcgggccacgg cgcttctgtaccgctgctgcttttgcGGTGAAGACCACCCGCAG	694

FIG. 5B

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
AHCu5	AHC	A	G	Q	R	cds	GE654	TAAAGAGGCGCTACCAGGCG	TGAGCTGGGAAAAGCCG	TAAAGAGGCGCTACCAGGCGggcgggccacggcgcttctgtaccgctgctgcttttgcggtgaagaccacccgc[a/g]gcagggcagcaccctctactgcgtgcccacgagcacaaatcaagcgcaggcggctccggaggagcggccgagggcccccctggtgggacacctcctctggtgcgctgcggccggtggcgctcaagagtccacaggtggtctgcgaggcagcctcagcgggcctgttgaagacgctgcgcttcgtcaagtacttgccctgcttccaggtgctgcccctggaccagcagctggtgctggtgcgcaactgctgggcgtccctgctcatgcttgagctggcccaggaccgcttgcagttcgagactgtggaagtctcggagcccagcatgctgcagaagatcctcaccaccaggcggcgggagaccgggggcaacgagccactgcccgtgcccacgctgcagcaccatttggcaccgccggcggaggccaggaaggtgccctccgcctcccaggtccaagccatcaagtgctttctttccaaatgctggagtctgaacatcagtaccaaggagtacgcctacctcaaggggaccgtgctctttaacccgggtaagggtactggccttaggcgcCGGCTTTTCCCAGCTCA	664
AHCu6	AHC	T	G	L	R	cds	GE654	TAAAGAGGCGCTACCAGGCG	TGAGCTGGGAAAAGCCG	TAAAGAGGCGCTACCAGGCGggcgggccacggcgcttctgtaccgctgctgcttttgcggtgaagaccacccgcagcagggcagcaccctctactgcgtgcccacgagcacaaatcaagcgcaggcggctccggaggagcggccgagggcccccctggtgggacacctcctctggtgcgctgcggccggtggcgctcaagagtccacaggtggtctgcgaggcagcctcagcgggcctgttgaagacgctgcgcttcgtcaagtacttgccctgcttccaggtgctgcccctggaccagcagctggtgctggtgcgcaactgctgggcgtccctgctcatgc[t/g]tgagctggcccaggaccgcttgcagttcgagactgtggaagtctcggagcccagcatgctgcagaagatcctcaccaccaggcggcgggagaccgggggcaacgagccactgcccgtgcccacgctgcagcaccatttggcaccgccggcggaggccaggaaggtgccctccgcctcccaggtccaagccatcaagtgctttctttccaaatgctggagtctgaacatcagtaccaaggagtacgcctacctcaaggggaccgtgctctttaacccgggtaagggtactggccttaggcgcCGGCTTTTCCCAGCTCA	664
ANX3d15	ANX3	T	C	F	S	cds	GE444	TCTCTATGTTGCTTTGTGACCAAT	GACTTACTTTAATTGCTGAATATAGG	TCTCTATGTTGCTTTGTGACCAATgacatttgtgttgtgaacacctgcattccttaacagggtattggaactgatgagtttactctgaaccgaataatggtgtccagatcagaaattgaccttttggacattcgaacagagt[t/c]caagaagcattatggctattcCCTATATTCAGCAATTAAAGTAAGTC	194
ANX3d16	ANX3	G	A	-	-	noncoding	GE444	TCTCTATGTTGCTTTGTGACCAAT	GACTTACTTTAATTGCTGAATATAGG	TCTCTATGTTGCTTTGTGACCAATgacatttgt[g/a]ttgtgaacacctgcattccttaacagggtattggaactgatgagtttactctgaaccgaataatggtgtccagatcagaaattgaccttttggacattcgaacagagttcaagaagcattatggctattcCCTATATTCAGCAATTAAAGTAAGTC	194
ANX3d17	ANX3	A	T	-	-	noncoding	GE453	TGTTGGCATTTAAACTTTTCTC	AAAAATTGTTATTGAGCATGCAG	TGTTGGCATTTAAACTTTTCTCtgttttataatcatatttttcagtttgtcaaggcttaatttcattctgatttggtttcagtatacaagaagagtcttggagatgacattagttccgaaacatctggtgacttccggaaagctctgttgactttggcagatgtaaggtttatttttatttt[a/t]taactccccagtaagCTGCATGCTCAATAACAATTTTT	227
ANX3d18	ANX3	T	C	-	-	noncoding	GE433	TTACTTACTATAGATTAACCCAATTTC	TTTCCCAAGGGAATTAAGGG	TTACTTACTATAGATTAACCCAATTTCtattccgtgaagctgaacat[t/c]atttgcttttgttacagttaattgtgtgaggaacacgccggccttttagccgaaagactgcatcgagccttgaaggttggtctggaaagttcatgtgcattcttagcgtCCCTTAATTCCCTTGGGAAA	183
ANX3d19	ANX3	T	C	-	-	noncoding	GE439	TGATTCATTTATGGTCTCCCATT	GAAGTAAGGTGGAGCTGTTGG	TGATTCATTTATGGTCTCCCATTatttatactgtatttgtttttcattgatttattctttgcagtcggatacttctggagactatgaaatcacactcttaaaatctgtggtggagatgactgaaccaagaagataatctccaaaggtccacgatgggcttt[t/c]CCAACAGCTCCACCTTACTTC	189
ANX3d20	ANX3	T	C	-	-	noncoding	GE439	TGATTCATTTATGGTCTCCCATT	GAAGTAAGGTGGAGCTGTTGG	TGATTCATTTATGGTCTCCCATTatttatactgtatttgtt[t/c]ttcattgatttattctttgcagtcggatacttctggagactatgaaatcacactcttaaaatctgtggtggagatgactgaaccaagaagataatctccaaaggtccacgatgggcttttCCAACAGCTCCACCTTACTTC	189
ANX3u1	ANX3	T	C	-	-	noncoding	GE443	GATGTCATTTTGAACCAATG	TGTAACTTGCCTGATTTGCTTC	GATGTCATTTTGAACCAATGgactttcaagtatttccttctaggttggacaccgaggaacagtaagagattatccagactttagcccatcagtggatgctgaagctattcagaaagcaatcagaggaattggtgagtga[t/c]atttacaattcctttcttaatgttGAAGCAAATCAGGCAAGTTACA	191

FIG. 5C

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ANX3u9	ANX3	G	A	S	N	cds	GE443	GATGTCATTTT GAACCAATG	TGTAACTTGCC TGATTTGCTTC	GATGTCATTTTGAACCAATGgactttcaagtatttccttctaggttggacaccgaggaacagtaa gagattatccagacttta[g/a]cccatcagtggatgctgaagctattcagaaagcaatcagagg aattggtgagtgatattttacaattcctttcttaatgttGAAGCAAATCAGGCAAGTTACA	191
APODd7	APOD	T	C	F	S	cds	GE320	AGAAGGCTCAG AATGACAACC	CAGCATAATTA CATTGAACCTT GTAG	AGAAGGCTCAGAATGACAACCccagctgctttgcgttcccgcagctccaggtcccttctccagcc acccagccccaagatggtgatgctgctgctgctgctttccgcactggctggcctct[t/c]cggt gcggcagagggacaagcatttcatcttgggaagtgccccaatcctccggtgcaggagaatttga cgtgaataaggtaaaaggcgaacctcccgtttgttttgctgcctccgctgtgaataagcgttCTA CAAGGTTCAATGTAATTATGCTG	283
APODd8	APOD	C	G	-	-	noncoding	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaatatcctgacttctaataacattgatgt caagaaaatgacggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctacaggga ggctgcacccactccatgttacttctgcttcgctttcccctaccccaccccc[c/g]ccataaA GACAAACCAATCAACCACGA	410
APODd9	APOD	C	A	-	-	noncoding	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaatatcctgacttctaataacattgatgt caagaaaatgacggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctacaggga ggctgcacccactccatgttacttctgcttcgctttcccctaccccacccccccccata[c/a]A GACAAACCAATCAACCACGA	410
APODu1	APOD	A	T	E	V	cds	GE304	CTGCGTCTGCA CGACAATG	ACCCAGTCACT CTGCGTCA	CTGCGTCTGCACGACAATGgggaagaagttgcaggtccccagagaaccacagggttttgctctgc ttgttgtctctgcagtatctcggaagatggtacgaaattgagaagatcccaacaacctttg[a/t]gaatggacgctgcatccaggccaactactcactaatggaaaacggaaagatcaaagtgttaaac caggagttgaggtgagtggctgtgggcgtccggggccaggcctgcggagtgcTGACGCAGAGTGA CTGGGT	266
APODu2	APOD	C	T	D	D	cds	GE320	AGAAGGCTCAG AATGACAACC	CAGCATAATTA CATTGAACCTT GTAG	AGAAGGCTCAGAATGACAACCccagctgctttgcgttcccgcagctccaggtcccttctccagcc acccagccccaagatggtgatgctgctgctgctgctttccgcactggctggcctcttcggtgcgg cagagggacaagcatttcatcttgggaagtgccccaatcctccggtgcaggagaatttga[c/t]gtgaataaggtaaaaggcgaacctcccgtttgttttgctgcctccgctgtgaataagcgttCTA CAAGGTTCAATGTAATTATGCTG	283
APODu3	APOD	T	G	S	A	cds	GE286	GCTTATTGGCT TTCAATGAGTT GT	TGTCTCAGGAA TTCTCCAAGC	GCTTATTGGCTTTCAATGAGTTGTttttcttttctcttttcgtttttgtattttttcttttttt aactcactgcagagctgatggaactgtgaatcaaatcgaaggtgaagccaccccagttaacctca cagagcctgccaagctggaagttaagttt[t/g]cctggtgtaagtatccacttttcccaggagg attcagggacaggaaatatgcaaactgaaggctagcgccccgGCTTGGAGAATTCCTGAGACA	258
APODu4	APOD	C	T	S	L	cds	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccat[c/t]ggcaccgtactggatcctggccaccgactatgagaactatgcc ctcgtgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaag aaaccctaatctccctccagaaacagtggactctctaaaaatatcctgacttctaataacattg atgtcaagaaaatgacggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctaca gggaggctgcacccactccatgttacttctgcttcgctttcccctaccccacccccccccataaA GACAAACCAATCAACCACGA	410

FIG. 5E

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ANX3u10	ANX3	T	G	L	R	cds	GE447	AAAAAGTATTTCACATTTTTCCC	TGATGACTTGGTCAAACCC	AAAAAGTATTTCACATTTTTCCCcttggtttttgattttaggagc[t/g]gaaagatgacttga agggtgatctctctggccactttgagcatctcatggtggccctagtgactccaccagcagtcttt gatgcaaagcagctaaagaaatccatgaaggtatgagccccccacaagccatttctgcccaGGGT TTGACCAAGTCATCA	210
ANX3u11	ANX3	A	G	P	P	cds	GE447	AAAAAGTATTTCACATTTTTCCC	TGATGACTTGGTCAAACCC	AAAAAGTATTTCACATTTTTCCCcttggtttttgattttaggagctgaaagatgacttgaaggg tgatctctctggccactttgagcatctcatggtggccctagtgactcc[a/g]ccagcagtcttt gatgcaaagcagctaaagaaatccatgaaggtatgagccccccacaagccatttctgcccaGGGT TTGACCAAGTCATCA	210
ANX3u12	ANX3	T	G	L	R	cds	GE441	AAAAAGAAATAATTGTGTCTCTAATATC	TGTAAAAACAACATACAACACAAAGG	AAAAAGAAATAATTGTGTCTCTAATATCattctcttgtgaatagattctctataaagctggtgag aacagatggggcacggatgaagacaaattcactgagatcc[t/g]gtgtttaaggagctttcctc aattaaaactaagtacaaactcaccattacaatCCTTTGTGTTGTATGTTGTTTTTACA	189
ANX3u13	ANX3	A	G	T	T	cds	GE460	ATTCAAATGTGCTCAACTGC	CTGAGTTAAAGCAAGTGCAA	ATTCAAATGTGCTCAACTGCgttgctttaaataatttgtggtgcttctttttagc[a/g]tttg atgaatacagaaatatcagccaaaaggacattgtggacagcataaaaggagaattatctgggcat tttgaagacttactgttggccataggtaagacttcgagtgctggtaaactaagttactTTGCACT TGCTTTAACTCAG	208
ANX3u14	ANX3	T	A	I	N	cds	GE460	ATTCAAATGTGCTCAACTGC	CTGAGTTAAAGCAAGTGCAA	ATTCAAATGTGCTCAACTGCgttgctttaaataatttgtggtgcttctttttagcatttgatga atacagaaata[t/a]cagccaaaaggacattgtggacagcataaaaggagaattatctgggcat tttgaagacttactgttggccataggtaagacttcgagtgctggtaaactaagttactTTGCACT TGCTTTAACTCAG	208
ANX3u2	ANX3	C	A	S	R	cds	GE425	CTTTTTAGGGCGCGGGA	AGCAACATTGGCTAAATATGTG	CTTTTTAGGGCGCGGGAacaaacgaagatgccttgattgaaatcttaactaccaggacaag[c/a]aggcaaatgaaggatatctctcaagcctattatacaggtgtcttatttctgcttaccttcacc actgttcaCACATATTTAGCCAATGTTGCT	160
ANX3u3	ANX3	C	T	P	L	cds	GE433	TTACTTACTATAGATTAACCCAATTTC	TTTCCCAAGGGAATTAAGGG	TTACTTACTATAGATTAACCCAATTTCtattccgtgaagctgaacattatttgctttttgttaca gttaattgtgtgaggaacacgc[c/t]ggccttttagccgaaagactgcatcgagccttgaagg ttggtctggaaagttcatgtgcattcttagcgtCCCTTAATTCCCTTGGGAAA	183
ANX3u4	ANX3	A	T	E	V	cds	GE444	TCTCTATGTTGCTTTGTGACCAAT	GACTTACTTTAATTGCTGAATATAGG	TCTCTATGTTGCTTTGTGACCAATgacatttgtgttgtgaacacctgcattccttaacagggtat tggaactgatgagtttactctgaaccgaataatggtgtccagatcag[a/t]aattgacctttg gacattcgaacagagttcaagaagcattatggctattcCCTATATTCAGCAATTAAAGTAAGTC	194
ANX3u5	ANX3	C	T	-	-	noncoding	GE439	TGATTCATTTATGGTCTCCCATT	GAAGTAAGGTGGAGCTGTTGG	TGATTCATTTATGGTCTCCCATTatttatactgtatttgtttttcattgattttatt[c/t]ttt gcagtcggatacttctggagactatgaaatcacactcttaaaaatctgtggtggagatgactgaa ccaagaagataatctccaaaggtccacgatgggcttttCCAACAGCTCCACCTTACTTC	189
ANX3u6	ANX3	G	T	-	-	noncoding	GE448	CTTTTGTTCAAGACAAATGTTGAG	TGATCTCTTACTGCCTGTCA	CTTTTGTTCAAGACAAATGTTGAGcataaatattgagtaaaataacttttt[g/t]tttcatttag gaactgatgagaaaatgctcatcagcattctgactgagaggtcaaatgcacagcggcagctgatt gttaaggaatatcaagcagcatatggaaaggtaaggtcacattaacaTGACAGGCAGTAAGAGAT CA	197
ANX3u7	ANX3	A	T	E	D	cds	GE425	CTTTTTAGGGCGCGGGA	AGCAACATTGGCTAAATATGTG	CTTTTTAGGGCGCGGGAacaaacga[a/t]gatgccttgattgaaatcttaactaccaggacaag caggcaaatgaaggatatctctcaagcctattatacaggtgtcttatttctgcttaccttcacc actgttcaCACATATTTAGCCAATGTTGCT	160
ANX3u8	ANX3	T	G	-	-	noncoding	GE443	GATGTCATTTTGAACCAATG	TGTAACTTGCCTGATTTGCTTC	GATGTCATTTTGAACCAATGgactttcaagtatt[t/g]ccttctaggttggacaccgaggaaca gtaagagattatccagactttagcccatcagtggatgctgaagctattcagaaagcaatcagagg aattggtgagtgatatttacaattcctttcttaatgttGAAGCAAATCAGGCAAGTTACA	191

FIG. 5D

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
APODu5	APOD	C	A	T	K	cds	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaatatcctgacttctaataacattgatgt caagaaaatga[c/a]ggtcacagaccaggtgaactgccccaagctctcgtaaccaggttctaca gggaggctgcacccactccatgttacttctgcttcgctttcccctaccccaccccccccataaA GACAAACCAATCAACCACGA	410
APODu6	APOD	T	A	L	H	cds	GE371	CAGCCTTCTTG TGTTGTCCTG	TCGTGGTTGAT TGGTTTGTCT	CAGCCTTCTTGTGTTGTCCTGagatttctcttgccctctccctccaataatgctgcctctctctg gttctcagttatgccatcggcaccgtactggatcctggccaccgactatgagaactatgccctcg tgtattcctgtacctgcatcatccaacttttcacgtggattttgcttggatcttggcaagaaac cctaatctccctccagaaacagtggactctctaaaaatatcctgacttctaataacattgatgt caagaaaatgacggtcacagaccaggtgaactgccccaagc[t/a]ctcgtaaccaggttctaca gggaggctgcacccactccatgttacttctgcttcgctttcccctaccccaccccccccataaA GACAAACCAATCAACCACGA	410
ARd10	AR	T	G	G	G	cds	GE655	CGGGGTAAGGG AAGTAGGTG	CCTCGCTCAGG ATGTCTTTA	CGGGGTAAGGGAAGTAGGTGgaagattcagccaagctcaaggatggaagtgcagttagggctggg aagggtctaccctcggccgccgtccaagacctaccgaggagctttccagaatctgttccagagcg tgcgcgaagtgatccagaacccgggccccaggcacccagaggccgcgagcgcagcacctcccggc gccagtttgctgctgctgcagcagcagcagcagcagcagcagcagcagcagcagcagcagcagca gcagcagcagcagcaagagactagccccaggcagcagcagcagcagcaggg[t/g]gaggatggt tctccccaagcccatcgtagaggccccacaggctacctggtcctggatgaggaacagcaaccttc acagccgcagtcggccctggagtgccaccccgagagaggttgcgtcccagagcctggagccgccg tggccgccagcaaggggctgccgcagcagctgccagcacctccggacgaggatgactcagctgcc ccatccacgttgtccctgctgggccccactttccccggcttaagcagctgctccgctgacctTAA AGACATCCTGAGCGAGG	602
ARd11	AR	G	C	E	Q	cds	GE655	CGGGGTAAGGG AAGTAGGTG	CCTCGCTCAGG ATGTCTTTA	CGGGGTAAGGGAAGTAGGTGgaagattcagccaagctcaaggatggaagtgcagttagggctggg aagggtctaccctcggccgccgtccaagacctaccgaggagctttccagaatctgttccagagcg tgcgcgaagtgatccagaacccgggccccaggcacccagaggccgcgagcgcagcacctcccggc gccagtttgctgctgctgcagcagcagcagcagcagcagcagcagcagcagcagcagcagcagca gcagcagcagcagcaagagactagccccaggcagcagcagcagcagcagggt[g/c]aggatggt tctccccaagcccatcgtagaggccccacaggctacctggtcctggatgaggaacagcaaccttc acagccgcagtcggccctggagtgccaccccgagagaggttgcgtcccagagcctggagccgccg tggccgccagcaaggggctgccgcagcagctgccagcacctccggacgaggatgactcagctgcc ccatccacgttgtccctgctgggccccactttccccggcttaagcagctgctccgctgacctTAA AGACATCCTGAGCGAGG	602
ARd12	AR	G	A	E	E	cds	GE659	CCACTTTCCCC GGCTTA	CGGCCAGAGCC AGTGGA	CCACTTTCCCCGGCTTAagcagctgctccgctgaccttaaagacatcctgagcgaggccagcacc atgcaactccttcagcaacagcagcaggaagcagtatccgaaggcagcagcagcgggagagcgag gga[g/a]gcctcgggggctcccacttcctccaaggacaattacttagggggcacttcgaccatt tctgacaacgccaaggagttgtgtaaggcagtgtcggtgtccatgggcctgggtgtggaggcgtt ggagcatctgagtccaggggaacagcttcgggggattgcatgtacgccccactttgggagttc cacccgctgtgcgtcccactccttgtgccccattggccgaatgcaaaggttctctgctagacgac agcgcaggcaagagcactgaagatactgctgagtattcccctttcaagggaggttacaccaaagg gctagaaggcgagagcctaggctgctctggcagcgctgcagcagggagctccgggacacttgaac tgccgtctaccctgtctctctacaagtccggagcactggacgaggcagctgcgtaccagagtcgc gactactacaactttCCACTGGCTCTGGCCG	616

FIG. 5F

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ARd9	AR	C	T	L	L	cds	GE573	CATGCTTCCCC TCCCCA	CAGGCTGTTCT CCCTGATAAA	CATGCTTCCCCTCCCCAttctgtcttcatcccacatcagttccagtggatgggctgaaaaatcaa aaattctttgatgaacttcgaatgaactacatcaaggaact[c/t]gatcgtatcattgcatgca aaagaaaaaatcccacatcctgctcaagacgcttctaccagctcaccaagctcctggactccgtg cagcctgtaagcaaacgatggagggtgcTTTATCAGGGAGAACAGCCTG	244
ARu1	AR	G	A	K	K	cds	GE584	TTCAGTGACAT GTGTTGCAT	AGTGTCTCTCT CTGGAAGGTAA	TTCAGTGACATGTGTTGCATtggtttttgtgtcttttccagtttggagactgccagggaccatg ttttgcccattgactattactttccaccccagaagacctgcctgatctgtggagatgaagcttct gggtgtcactatggagctctcacatgtggaagctgcaa[g/a]gtcttcttcaaaagagccgctg aaggtaaagggtcttgcacatgcagcttctctttccctttctcctTTACCTTCCAGAGAGACA CT	262
ARu2	AR	T	A	L	H	cds	GE575	AAACTTCCCCT CATTCCTTTT	CAAAAGTGGTC CTCTCTGAATC TC	AAACTTCCCCTCATTCCTTTTtcctctgtgtatctccttcccaggtaccgcatgcacaagtcccg gatgtacagccagtgtgtccgaatgaggcacctctctcaagagtttggatggctccaaatcaccc cccaggaattcctgtgcatgaaagcactgctac[t/a]cttcagcattagtaagtgcctagaagt gcagggaatgccccctgagggcacaGAGATTCAGAGAGGACCACTTTTG	244
ARu3	AR	G	C	-	-	noncoding	GE586	TCAGACTTAGC TCAACCCGTC	CCAAGCTGCTG TATTTTAGTGA G	TCAGACTTAGCTCAACCCGTCagtagtacccagactgaccactgcctctgcctcttcttctccag gcttccgcaacttacacgtggacgaccagatggctgtcattcagtactcctggatggggctcatg gtgtttgccatgggctggcgatccttcaccaatgtcaactccaggatgctctacttcgcccctga tctggttttcaatgagtaagt[g/c]ctcctggggcccagagacCTCACTAAAATACAGCAGCTT GG	262
ARu4	AR	T	A	L	*	cds	GE630	TTTTGACCACT GATGATAAATT C	AAATATGATCC CCTTATCTCA	TTTTGACCACTGATGATAAATTCaagtctctcttccttcccaatagcccggaagctgaagaaact tggtaatctgaaactacaggaggaaggagaggcttccagcaccaccagccccactgaggagacaa cccagaagctgacagtgtcacacattgaaggctatgaatgtcagcccatctttctgaatgtcctg gaagccattgagccaggtgtagtgtgtgctggacacgacaacaaccagcccgactcctttgcagc cttgctctctagcctcaatgaactgggagagagacagcttgtacacgtggtcaagtgggccaagg cct[t/a]gcctggtaaggaaaagggaagtgggagcaTGAGATAAGGGGATCATATTT	384
ARu5	AR	T	G	S	A	cds	GE1221	TTCATGTGGTA GGATATAATTT CA	TCTGGTCTAAA GAGAGACTAGA AAAT	TTCATGTGGTAGGATATAATTTCAtatcttttctgttctagaaatacccgaagaaagagactctg gaaactcattatcaggtctatcaactcttgtatgtgttctcccagggaaacagaagtacctgtgc gccagcagaaatgattgcactattgataaattccgaaggaaaaattgtcca[t/g]cttgtcgtc ttcggaaatgttatgaagcagggatgactctgggaggtaagatactttctttctcttcctcctc cttcctctctccccttctccctcATTTTCTAGTCTCTCTTTAGACCAGA	310
ARu6	AR	T	G	C	G	cds	GE575	AAACTTCCCCT CATTCCTTTT	CAAAAGTGGTC CTCTCTGAATC TC	AAACTTCCCCTCATTCCTTTTtcctctgtgtatctccttcccaggtaccgcatgcacaagtcccg gatgtacagccagtgtgtccgaatgaggcacctctctcaagagtttggatggctccaaatcaccc cccaggaattcctg[t/g]gcatgaaagcactgctactcttcagcattagtaagtgcctagaagt gcagggaatgccccctgagggcacaGAGATTCAGAGAGGACCACTTTTG	244
ARu7	AR	T	C	S	P	cds	GE659	CCACTTTCCCC GGCTTA	CGGCCAGAGCC AGTGGA	CCACTTTCCCCGGCTTAagcagctgc[t/c]ccgctgaccttaaagacatcctgagcgaggccag caccatgcaactccttcagcaacagcagcaggaagcagtatccgaaggcagcagcagcgggagag cgagggaggcctcgggggctcccacttcctccaaggacaattacttagggggcacttcgaccatt tctgacaacgccaaggagttgtgtaaggcagtgtcggtgtccatgggcctgggtgtggaggcgtt ggagcatctgagtccaggggaacagcttcggggggattgcatgtacgccccactttgggagttc cacccgctgtgcgtcccactccttgtgccccattggccgaatgcaaaggttctctgctagacgac agcgcaggcaagagcactgaagatactgctgagtattccccttcaaggaggttacaccaaagg gctagaaggcgagagcctaggctgctctggcagcgctgcagcagggagctccgggacacttgaac tgccgtctaccctgtctctctacaagtccggagcactggacgaggcagctgcgtaccagagtcgc gactactacaactttCCACTGGCTCTGGCCG	616

FIG. 5G

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
ARu8	AR	T	C	S	S	cds	GE568	CTCCTTGTCAA CCCTGTTTTT	GGGCATGAGCT GGGGTG	CTCCTTGTCAACCCTGTTTTTctccctcttattgttccctacagattgcgagagagctgcatcag ttcacttttgacctgctaatcaagtcacacatggtgagcgtggactttccggaaatgatggcaga gatcatctctgtgcaagtgcccaagatcctttc[t/c]gggaaagtcaagcccatctatttccac acccagtgaagcattggaaaccctatttcccCACCCCAGCTCATGCCC	243
BDNFu1	BDNF	G	A	V	M	cds	GE1184	AAGCCCTAACC AGTTTTCTG	GTTTCCCTTCT GGTCATGGA	AAGCCCTAACCAGTTTTCTGtcttgtttctgctttctccctacagttccaccaggtgagaagagt gatgaccatccttttccttactatggttatttcatactttggttgcatgaaggctgcccccatga aagaagcaaacatccgaggacaaggtggcttggcctacccaggtgtgcggacccatgggactctg gagagcgtgaatgggcccaaggcaggttcaagaggcttgacatcattggctgacactttcgaaca c[g/a]tgatagaagagctgttggatgaggaccagaaagttcggcccaatgaagaaaacaataag gacgcagacttgtacacgtccagggtgatgctcagtagtcaagtgcctttggagcctcctcttct ctttctgctggaggaatacaaaaattacctagatgctgcaaacatgtccatgaggtccggcgcc actctgaccctgcccgccgaggggagctgagcgtgtgtgacagtattagtgagtgggtaacggcg gcagacaaaaagactgcagtggacatgtcgggcgggacggtcacagtccttgaaaaggtccctgt atcaaaaggccaactgaagcaatacttctacgagaccaagtgcaatcccatgggttacacaaaag aaggctgcaggggcatagacaaaaggcattggaactcccagtgccgaactacccagtcgtacgtg cgggcccttaccatggatagcaaaaagagaattggctggcgattcataaggatagacacttcttg tgtatgtacattgaccattaaaaggggaagatagtggatttatgttgtatagattagattatatt gagacaaaaattatctatttgtatatatacataacagggtaaattattcagttaagaaaaaaata attttatgaactgcatgtataaatgaagtttatacagtacagtggttctacaatctatttattgg acatgTCCATGACCAGAAGGGAAAC	100
BDNFu2	BDNF	T	G	I	R	cds	GE1184	AAGCCCTAACC AGTTTTCTG	GTTTCCCTTCT GGTCATGGA	AAGCCCTAACCAGTTTTCTGtcttgtttctgctttctccctacagttccaccaggtgagaagagt gatgaccatccttttccttactatggttatttcatactttggttgcatgaaggctgcccccatga aagaagcaaacatccgaggacaaggtggcttggcctacccaggtgtgcggacccatgggactctg gagagcgtgaatgggcccaaggcaggttcaagaggcttgacatcattggctgacactttcgaaca cgtgatagaagagctgttggatgaggaccagaaagttcggcccaatgaagaaaacaataaggacg cagacttgtacacgtccagggtgatgctcagtagtcaagtgcctttggagcctcctcttctcttt ctgctggaggaatacaaaaattacctagatgctgcaaacatgtccatgaggtccggcgccactc tgaccctgcccgccgaggggagctgagcgtgtgtgacagtattagtgagtgggtaacggcggcag acaaaaagactgcagtggacatgtcgggcgggacggtcacagtccttgaaaaggtccctgtatca aaaggccaactgaagcaatacttctacgagaccaagtgcaatcccatgggttacacaaaagaagg ctgcaggggcatagacaaaaggcattggaactcccagtgccgaactacccagtcgtacgtgcggg cccttaccatggatagcaaaaagagaattggctggcgattcataagga[t/g]agacacttcttg tgtatgtacattgaccattaaaaggggaagatagtggatttatgttgtatagattagattatatt gagacaaaaattatctatttgtatatatacataacagggtaaattattcagttaagaaaaaaata attttatgaactgcatgtataaatgaagtttatacagtacagtggttctacaatctatttattgg acatgTCCATGACCAGAAGGGAAAC	1000

FIG. 5H

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
BDNFu3	BDNF	A	G	K	R	cds	GE1184	AAGCCCTAACCAGTTTTCTG	GTTTCCCTTCTGGTCATGGA	AAGCCCTAACCAGTTTTCTGtcttgtttctgctttctccctacagttccaccaggtgagaagagt gatgaccatcctttccttactatggttatttcatactttggttgcatga[a/g]ggctgccccc atgaaagaagcaaacatccgaggacaaggtggcttggcctacccaggtgtgcggacccatgggac tctggagagcgtgaatgggcccaaggcaggttcaagaggcttgacatcattggctgacactttcg aacacgtgatagaagagctgttggatgaggaccagaaagttcggcccaatgaagaaaacaataag gacgcagacttgtacacgtccagggtgatgctcagtagtcaagtgcctttggagcctcctcttct ctttctgctggaggaatacaaaaattacctagatgctgcaaacatgtccatgagggtccggcgcc actctgaccctgcccgccgaggggagctgagcgtgtgtgacagtattagtgagtgggtaacggcg gcagacaaaaagactgcagtggacatgtcgggcgggacggtcacagtccttgaaaaggtccctgt atcaaaaggccaactgaagcaatacttctacgagaccaagtgcaatcccatgggttacacaaaag aaggctgcaggggcatagacaaaaggcattggaactcccagtgccgaactacccagtcgtacgtg cgggcccttaccatggatagcaaaaagagaattggctggcgattcataaggatagacacttcttg tgtatgtacattgaccattaaaggggaagatagtggatttatgttgtatagattagattatatt gagacaaaaattatctatttgtatatatacataacagggtaaattattcagttaagaaaaaata atttatgaactgcatgtataaatgaagtttatacagtacagtggttctacaatctatttattgg acatgTCCATGACCAGAAGGGAAAC	1000
CD36d8	CD36	G	A	P	P	cds	GE459	TGTCTTAAACAGTGACTTTGTTTTTGT	TGCCATTCATATTTGGTACT	TGTCTTAAACAGTGACTTTGTTTTTGTaggctgcatcccatatctatcaaaatcaatttgttcaa atgatcctcaattcacttattaacaagtcaaaatcttctatgttccaagtcagaactttgagaga actgttatggggctatagggatccattttgagtttggttcc[g/a]taccctgttactaccaca gttggtctgttttatcctgtaAGTACCAAATATGAATGGCA	236
CD36u1	CD36	A	T	Q	L	cds	GE437	CTGCTGTTTCTTTAGAGTTCG	TGTTGTTTGTCTACTCACTGCCA	CTGCTGTTTCTTTAGAGTTCGtttctagccaaggaaaatgtaacccaggacgctgaggacaaca cagtctctttcctgc[a/t]gcccaatggtgccatcttcgaaccttcactatcagttggaacaga ggctgacaacttcacagttctcaatctggctgTGGCAGTGAGTAGACAAACAACA	185
CD36u2	CD36	T	G	V	V	cds	GE437	CTGCTGTTTCTTTAGAGTTCG	TGTTGTTTGTCTACTCACTGCCA	CTGCTGTTTCTTTAGAGTTCGtttctagccaaggaaaatgtaacccaggacgctgaggacaaca cagtctctttcctgcagcccaatggtgccatcttcgaaccttcactatcagttggaacagaggct gacaacttcacagt[t/g]ctcaatctggctgTGGCAGTGAGTAGACAAACAACA	185
CD36u3	CD36	G	T	V	F	cds	GE459	TGTCTTAAACAGTGACTTTGTTTTTGT	TGCCATTCATATTTGGTACT	TGTCTTAAACAGTGACTTTGTTTTTGTaggctgcatcccatatctatcaaaatcaattt[g/t]t tcaaatgatcctcaattcacttattaacaagtcaaaatcttctatgttccaagtcagaactttga gagaactgttatggggctatagggatccattttgagtttggttccgtaccctgttactaccaca gttggtctgttttatcctgtaAGTACCAAATATGAATGGCA	236
CD36u4	CD36	T	A	G	G	cds	GE437	CTGCTGTTTCTTTAGAGTTCG	TGTTGTTTGTCTACTCACTGCCA	CTGCTGTTTCTTTAGAGTTCGtttctagccaaggaaaatgtaacccaggacgctgaggacaaca cagtctctttcctgcagcccaatgg[t/a]gccatcttcgaaccttcactatcagttggaacaga ggctgacaacttcacagttctcaatctggctgTGGCAGTGAGTAGACAAACAACA	185
CD36u5	CD36	G	T	V	V	cds	GE476	TGGAATGCAGCTCTTTTT	ATGGACTGTGCTACTGAGG	TGGAATGCAGCTCTTTTTtctctgtatttaggtcaatctatgctgtatttgaatccgacgttaat ctgaaaggaatccctgt[g/t]tatagatttgttcttccatccaaggcctttgcctctccagttg aaaacccagacaactattgtttctgcacagaaaaattatctcaaaaaattgtacatcatatggt gtgctagacatcagcaaatgcaaagaaggtgagtaaataaCCTCAGTAGCACAGTCCAT	254
CD36u6	CD36	G	A	S	N	cds	GE426	TCCTAGGAATCTGTCCTATTG	CTGTGATGACCACAAAACA	TCCTAGGAATCTGTCCTATTGggaaa[g/a]tcactgcgacatgattaatggtacaggtaagaat attTGTTTTGTGGTCATCACAG	87
CD36u7	CD36	A	T	V	V	cds	GE440	ATCATTTGCCACTCGATTT	GCATACTTATACTTCAGTATCTGTCTTACC	ATCATTTGCCACTCGATTTtaaacagatgcagcctcatttccacctttgttgagaaagccag gt[a/t]ttgcagttcttttcttctgatatttgcaGGTAAGACAGATACTGAAGTATAAGTATGC	130

FIG. 5I

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CGAu1	CGA	A	G	R	R	cds	GE529	TTTTTGCCATGTCTGTCTG	AAATGTGTGTTGTCCTTATTACTT	TTTTTGCCATGTCTGTCTGcaggagcgccatggattactacag[a/g]aaatatgcagctatctttctggtcacattgtcggtgtttctgcatgttctccattccgctcctgatgtgcagggtgcgtgaccaaatttgtggttcAAGTAATAAGGACAACACACATTT	168
CNTFu1	CNTF	A	G	H	R	cds	GE1154	TTTAAGGACACTGGGGTGAT	GGGAACTACGCATATTCCATTAG	TTTAAGGACACTGGGGTGATgacagaagatgtggtgtttcctgtatcctcggccaggtgaagcatcagggcctgaacaagaacatcaacctggactctgcggatgggatgccagtggcaagcactgatcagtggagtgagctgaccgaggcagagcgactccaagagaaccttcaagcttatcgtaccttccatgttttgttggccaggctcttagaagaccagcaggtgcattttaccccaaccgaaggtgacttccatcaagctatacataccctcttctccaagtcgctgcctttgcataccagatagaggagttaatgatactcctggaatacaagatcccccgcaatgaggctgatgggatgcctattaatgttggagatggtggtctctttgagaagaagctgtggggcctaaaggtgctgcaggagctttcacagtggacagtaaggtccatccatgaccttcgtttcatttcttctc[a/g]tcagactgggatcccagcacgtgggagccattatattgctaacaacaagaaaatgtagcagttagtcccttctctcttccttgctttctcttCTAATGGAATATGCGTAGTTCCC	607
CNTFu2	CNTF	C	G	A	G	cds	GE1080	TTTGGACCAGTATAGACAGAAG	TGGTAAGTTGCTGGATCAAAAA	TTTGGACCAGTATAGACAGAAGtaaacccagctgacttgtttcctgggacagttgagttaagggatggctttcacagagcattcaccgctgacccctcaccgtcgggacctctgtagccgctctatctggctag[c/g]aaggaagattcgttcagacctgactgctcttacggaatcctatgtaagttgcctattttgctgttatctgaaacccttcatctTTTTTGATCCAGCAACTTACCA	245
COMTu1	COMT	G	A	P	P	cds	GE1039	CCTGTCTGTGAGGACGTGG	GGGCTCACCTCCAAGAG	CCTGTCTGTGAGGACGTGGcactgacaggcgctgttccaggtcacccttgtggttggagcgtcccaggacatcatcccccagctgaagaagaagtatgatgtggacacactggacatggtcttcctcgaccactggaaggaccggtacctgcc[g/a]gacacgcttCTCTTGGAGGTGAGCCC	185
COMTu2	COMT	G	A	-	-	noncoding	GE1151	AGAGGCACACACCTGCT	GAACCCCAACCTTTCTTGT	AGAGGCACACACCTGCTctgtctacccgagggcaccagagggcacgagaaggctggctccctggcgctgacacgtcaggcaactgaggcacaaggctggcatttctgaaccttgcccctctgc[g/a]aacacaagggggcgatggtggcactccaagcaaaggggcgtgtgggtgctgcaggaggagcacagagcactggcgcccctcccctcccgccctgcagatgccggaggccccgcctctgctgttggcagctgtgttgctgggcctggtgctgctggtggtgctgctgctgcttctgaggcactggggctggggcctgtcccttatcggctggaacgagttcatcctgcagcccatccacaacctgctcatgggtgacaccaaggagcagcgcatcctgaaccacgtgctgcagcatgcggagcccgggaacgcacagagcgtgctggaggccattgacacctactgcgagcagaaggagtgggccatgaacgtgggcgACAAGAAAGGTTGGGGTTC	524
COMTu3	COMT	C	T	H	H	cds	GE1151	AGAGGCACACACCTGCT	GAACCCCAACCTTTCTTGT	AGAGGCACACACCTGCTctgtctacccgagggcaccagagggcacgagaaggctggctccctggcgctgacacgtcaggcaactgaggcacaaggctggcatttctgaaccttgcccctctgcgaacacaagggggcgatggtggcactccaagcaaaggggcgtgtgggtgctgcaggaggagcacagagcactggcgcccctcccctcccgccctgcagatgccggaggccccgcctctgctgttggcagctgtgttgctgggcctggtgctgctggtggtgctgctgctgcttctgaggcactggggctggggcctgtcccttatcggctggaacgagttcatcctgcagcccatccacaacctgctcatgggtgacaccaaggagcagcgcatcctgaacca[c/t]gtgctgcagcatgcggagcccgggaacgcacagagcgtgctggaggccattgacacctactgcgagcagaaggagtgggccatgaacgtgggcgACAAGAAAGGTTGGGGTTC	524

FIG. 5J

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
COMTu4	COMT	C	G	S	C	cds	GE1151	AGAGGCACACA CCTGCT	GAACCCCAACC TTTCTTGT	AGAGGCACACACCTGCTctgtctacccgagggcaccagagggcacgagaaggctggctccctggc gctgacacgtcaggcaactgaggcacaaggctggcatttctgaaccttgcccctctgcgaacaca agggggcgatggtggcactccaagcaaaggggcgtgtgggtgctgcaggaggagcacagagcact ggcgcccctcccctcccgccctgcagatgccggaggccccgcctctgctgttggcagctgtgttg ctgggcctggtgctgctggtggtgctgctgcttctgaggcactggggctggggcctgt(c/g)ccttatcggctggaacgagttcatcctgcagcccatccacaacctgctcatgggtgacaccaag gagcagcgcatcctgaaccacgtgctgcagcatgcggagcccgggaacgcacagagcgtgctgga ggccattgacacctactgcgagcagaaggagtgggccatgaacgtgggcgACAAGAAAGGTTGGG GTTC	524
COMTu5	COMT	C	G	L	L	cds	GE1105	CACCTGTGCTC ACCTCTCC	GCCCTTTTTCC AGGTCTGA	CACCTGTGCTCACCTCTCCtccgtccccaacccctgccaggcaagatcgtggacgccgtgattca ggagcaccagccctccgtgctgctggagctgggggcctactgtggctactcagctgtgcgcatgg cccgcctgctgtcaccaggggcgaggct(c/g)atcaccatcgagatcaaccccgactgtgccgc catcacccagcggatggtggatttcgctggcatgaaggacaaggtgtgcatgcctgacccgttgT CAGACCTGGAAAAAGGGC	278
COMTu6	COMT	A	G	M	V	cds	GE1105	CACCTGTGCTC ACCTCTCC	GCCCTTTTTCC AGGTCTGA	CACCTGTGCTCACCTCTCCtccgtccccaacccctgccaggcaagatcgtggacgccgtgattca ggagcaccagccctccgtgctgctggagctgggggcctactgtggctactcagctgtgcgcatgg cccgcctgctgtcaccaggggcgaggctcatcaccatcgagatcaaccccgactgtgccgccatc acccagcggatggtggatttcgctggc(a/g)tgaaggacaaggtgtgcatgcctgacccgttgT CAGACCTGGAAAAAGGGC	278
CRHd1	CRH	A	G	-	-	noncoding	GE580	GAAGAGGGTCG ACACTATAAAA	ACGCAAAGTTG GTGGCGT	GAAGAGGGTCGACACTATAAAAtcccactccaggctctggagtggagaaactcagagaccaagtc cattgagagactgaggggaaagagaggagagaaagaaaaagagagtgggaacagtaaagagaaag gaagacaacctccagag(a/g)aagcccccggagacgtctctctgcagagaggcggcagcacccg gctcacctgcgaagcgcctgggaaggtagggagcgcctggacggaacACGCCACCAACTTTGCGT	260
CRHd2	CRH	C	G	-	-	noncoding	GE580	GAAGAGGGTCG ACACTATAAAA	ACGCAAAGTTG GTGGCGT	GAAGAGGGTCGACACTATAAAAtcccactccaggctctggagtggagaaactcagagaccaagtc cattgagagactgaggggaaagagaggagagaaagaaaaagagagtgggaacagtaaagagaaag gaagacaacctccagagaaagcc(c/g)ccggagacgtctctctgcagagaggcggcagcacccg gctcacctgcgaagcgcctgggaaggtagggagcgcctggacggaacACGCCACCAACTTTGCGT	260
CRHd3	CRH	G	A	-	-	noncoding	GE580	GAAGAGGGTCG ACACTATAAAA	ACGCAAAGTTG GTGGCGT	GAAGAGGGTCGACACTATAAAAtcccactccaggctctggagtggagaaactcagagaccaagtc cattgagagactgaggggaaagagaggagagaaagaaaaagagagtgggaacagtaaagagaaag gaagacaacctccagagaaagcccccggagacgtctctctgcagagaggcggcagcaccc(g/a) gctcacctgcgaagcgcctgggaaggtagggagcgcctggacggaacACGCCACCAACTTTGCGT	260
CYP11A d5	CYP11 A	C	T	N	N	cds	GE608	GGCCCCGTCAG AAATGG	GGGCTCCGAGG AGGAGA	GGCCCCGTCAGAAATGGctcctcagcctcttcctctccctgcagccatcactaa(c/t)gtcatt tttggggagcgccaggggatgctggaggaagtagtgaaccccgaggcccagcgattcattgatgc catctaccagatgttccacaccagcgtccccatgctcaaccttcccccagacctgttccgtctgt tcaggaccaagacctggaaggaccatgtggctgcatgggacgtgatttcagtaaaggtgagggc ttctctggctgtgcTCTCCTCCTCGGAGCCC	291
CYP11A u1	CYP11 A	C	T	V	V	cds	GE564	GATCCTTCCAT CAGCCC	CACCACCTCCC TCCAGT	GATCCTTCCATCAGCCCctctcccccacccctccagggagaagctcggcaacgtggagtcggttt atgtcatcgaccctgaagatgtggcccttctctttaagtccgagggccccaacccagaacgattc ctcatcccgccctgggtcgcctatcaccagtattaccagagacccataggagt(c/t)ctgttga agtgagtcctgggccatctcccagggACTGGAGGGAGGTGGTG	238
CYP11A u2	CYP11 A	T	C	V	A	cds	GE1323	TCCTCCCGCAG ACTTCAC	AGCCCTCTCTG ACTGGCA	TCCTCCCGCAGACTTCACcccatctccgtgaccctgcagagatatcttg(t/c)aaatgacttgg ttcttcgagattacatgattcctgccaaggtaggtgcagccagcaggctgcagctcTGCCAGTCA GAGAGGGCT	139

FIG. 5K

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11Au3	CYP11A	G	A	E	K	cds	GE585	CTGCAGGGAACCTCACTCTT	CACAGGGGCAACAAGGT	CTGCAGGGAACCTCACTCTTttttctttcctccttccccacagctgacatatacacccagaacttctactgggaattgagacagaaaggaagtgttcaccacgattaccgtggcatcctctacagactcctgggagacagcaagatgtccttc[g/a]aggacatcaaggccaacgtcacagagatgctggcaggaggggtggacacggtgaggtggctgtaggggcggcACCTTGTTGCCCCCTGTG	248
CYP11Au4	CYP11A	T	A	L	Q	cds	GE556	CTACTCCCCACCAGACG	CCAGGGATTGGAGTTGGG	CTACTCCCCACCAGACGtccatgaccctgcagtggcacttgtatgagatggcacgcaacctgaaggtgcaggatatgctgcgggcagaggtcttggctgcgcggcaccaggcccagggagacatggccacgatgctacagctggtccccctcctcaaagccagcatcaaggagacac[t/a]aaggcaagcccacaaccacccatgccgccCCCAACTCCAATCCCTGG	229
CYP11B1a30	CYP11B1	A	T	N	I	cds	GE570	TCCCAGCACCAAAGTCTGAG	GGCATCACCCTCTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaatgtctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttgtctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttg	243
CYP11B1a31	CYP11B1	A	G	-	-	noncoding	GE577	GAATGGGCCTGAATGGC	CTCCAGGGTCTCTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccac[a/g]tgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B1a32	CYP11B1	A	T	-	-	noncoding	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcaggggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccattttcaggtaaagccctccctggccc[a/t]cgctGGGAACACCCAGAGCCCT	285
CYP11B1a33	CYP11B1	C	T	-	-	noncoding	GE625	GGAGGCAGCCAGGAGGC	GTGTCCCTTCCCCATAGCAC	GGAGGCAGCCAGGAGGC[c/t]cggggctgccttgtgctcagcagtgcatcctccccgaagccagcaacttggctcttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggaccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B1d24	CYP11B1	G	C	-	-	noncoding	GE1231	GCAACTTTGAGGGTCTGAGAA	CCTGGGGTCAGGCAGAAA	GCAACTTTGAGGGTCTGAGAAggctgcaccacgtcgatgggctgcggaccaagccagatggaaaccc[g/c]gctgctgcaccaggtgctgaaacacctccaggtggagacactaacccaagaggacataaagatggtctacagcttcatattgaggcccagcatgttcccccctcctcaccttcagagccatcaactaatcacgtctctgcacccagggtcccagcctggccaccagcctcccTTTCTGCCTGACCCCAGG	261
CYP11B1d25	CYP11B1	T	C	Y	Y	cds	GE570	TCCCAGCACCAAAGTCTGAG	GGCATCACCCTCTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaatcta[t/c]caggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B1d26	CYP11B1	C	G	N	K	cds	GE577	GAATGGGCCTGAATGGC	CTCCAGGGTCTCTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaa[c/g]gctgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccacatgggaagatcCAGCCTCAGAGACCCTGGAG	246

FIG. 5L

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 1d27	CYP11 B1	C	A	-	-	noncoding	GE582	CTCCTGTGCAA GGTCTG	CTCCAGCAGGG GGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctnccccttgctgcgtgcggccctcaaggagaccttg[c/a]ggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B 1d28	CYP11 B1	C	T	-	-	noncoding	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccattttcaggtaaagccctcc[c/t]tggcccacgctGGGAACACCCAGAGCCCT	285
CYP11B 1d29	CYP11 B1	C	T	-	-	noncoding	GE625	GGAGGCAGCCA GGAGGC	GTGTCCCTTCC CCATAGCAC	GGAGGCAGCCAGGAGGCc[c/t]ggggctgccttgtgctcagcagtgcatcctccccgaagccagcaacttggctctttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggaccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B 1u1	CYP11 B1	A	G	Q	R	cds	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgcccc[a/g]gcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccattttcaggtaaagccctccctggcccacgctGGGAACACCCAGAGCCCT	285
CYP11B 1u10	CYP11 B1	C	G	P	A	cds	GE582	CTCCTGTGCAA GGTCTG	CTCCAGCAGGG GGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctn[c/g]cccttgctgcgtgcggccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B 1u11	CYP11 B1	T	G	-	-	noncoding	GE582	CTCCTGTGCAA GGTCTG	CTCCAGCAGGG GGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctnccccttgctgcg[t/g]gcggccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B 1u12	CYP11 B1	C	T	L	L	cds	GE531	ACAGGAAGCCC CATCCA	AGGTTCTCAGC TCGAGGGGT	ACAGGAAGCCCCATCCAgctgaggaccctttctatggatgcccccacctccaggctctaccctgtgggtctgttt[c/t]tggagcgagtggtgagctcagacttggtgcttcagaactaccacatcccagctggggtgagtgagccccacACCCCTCGAGCTGAGAACCT	171
CYP11B 1u13	CYP11 B1	T	C	L	L	cds	GE618	CTCCCCAGTCA TTCCCTGA	GCCCATGCTGC CCAGAC	CTCCCCAGTCATTCCCTGAtccccgctctgcaccgtccgcagacattggtgcgcgtgttcctctactctctgggtcgcaaccccgccttgttcccgaggcctgagcgctataacccccagcgctggctagacatcaggggctccggcaggaacttctaccacgtgccctttggctttggcatgcgccagtgcct[t/c]gggcggcgcctggcagaggcagagatgctgctgctgctgcaccatgtgagcaggcccgggctggggaggggcctgggcgggGTCTGGGCAGCATGGGC	297
CYP11B 1u14	CYP11 B1	G	A	C	Y	cds	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgt[g/a]catggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgcccCagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccattttcaggtaaagccctccctggcccacgctGGGAACACCCAGAGCCCT	285

FIG. 5M

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B1u15	CYP11B1	G	A	R	H	cds	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagc[g/a]tccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaactggggcccattttcaggtaaagccctccctggcccacgctGGGAACACCCAGAGCCCT	285
CYP11B1u16	CYP11B1	C	T	D	D	cds	GE536	ATGGTCCCATTCCAGCAC	AGCAAGAACACGCCACA	ATGGTCCCATTCCAGCACggcctcgtgcttggccccacaggtacga[c/t]ttgggaggagcaggcatggtgtgtgatgctgccggaggacgtggagaagctgcaacaggtggacagcctgcatccccacaggatgagcctggagccctgggtggcctacagacaacatcgtgggcacaaaTGTGGCGTGTTCTTGCT	200
CYP11B1u17	CYP11B1	G	A	L	L	cds	GE625	GGAGGCAGCCAGGAGGC	GTGTCCCTTCCCCATAGCAC	GGAGGCAGCCAGGAGGCccggggctgccttgtgctcagcagtgcatcctccccgaagccagcaactt[g/a]gctcttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggaccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B1u18	CYP11B1	C	T	-	-	noncoding	GE570	TCCCAGCACCAAAGTCTGAG	GGCATCACCCTCTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcc[c/t]gctccccggataggcgacaactgtatccagaaaatctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B1u19	CYP11B1	G	A	A	T	cds	GE582	CTCCTGTGCAAGGTCTG	CTCCAGCAGGGGGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaaccccaacgtgcagcaggccctgcgccaggagagcctggccgcc[g/a]cagccagcatcagtgaacatccccagaaggcaaccaccgagctnccccttgctgcgtgcggccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B1u2	CYP11B1	A	G	E	E	cds	GE617	ATGGCACTCAGGGCAAA	AGGGCTCTGGGTGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccagga[a/g]ctggggcccattttcaggtaaagccctccctggcccacgctGGGAACACCCAGAGCCCT	285
CYP11B1u20	CYP11B1	T	C	V	A	cds	GE531	ACAGGAAGCCCCATCCA	AGGTTCTCAGCTCGAGGGGT	ACAGGAAGCCCCATCCAgctgaggaccctttctatggatgcccccacctccaggctctaccctgtgggtctgtttctggagcgagtgg[t/c]gagctcagacttggtgcttcagaactaccacatcccagctggggtgagtgagccccacACCCCTCGAGCTGAGAACCT	171
CYP11B1u21	CYP11B1	C	G	R	R	cds	GE618	CTCCCCAGTCATTCCCTGA	GCCCATGCTGCCCAGAC	CTCCCCAGTCATTCCCTGAtccccgctctgcaccgtccgcagacattggtgcgcgtgttcctctactctctgggtcgcaaccccgccttgttcccgaggcctgagcgctataacccccagcgctggctagacatcaggggctccggcaggaacttctaccacgtgccctttggctttggcatgcgccagtgccttgggcggcg[c/g]ctggcagaggcagagatgctgctgctgctgcaccatgtgagcaggcccggctggggagggggcctgggcgggGTCTGGGCAGCATGGGC	297
CYP11B1u22	CYP11B1	A	T	T	S	cds	GE625	GGAGGCAGCCAGGAGGC	GTGTCCCTTCCCCATAGCAC	GGAGGCAGCCAGGAGGCccggggctgccttgtgctcagcagtgcatcctccccgaagccagcaacttggctcttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctgg[a/t]ccagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307

FIG. 5N

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 1u23	CYP11 B1	C	G	-	-	noncoding	GE577	GAATGGGCCTG AATGGC	CTCCAGGGTCT CTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggcca[c/g]atgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B 1u3	CYP11 B1	G	A	L	L	cds	GE617	ATGGCACTCAG GGCAAA	AGGGCTCTGGG TGTTCCC	ATGGCACTCAGGGCAAAggcagaggtgtgcatggcagtgccctggctgtccctgcaaagggcacaggcactgggcacgagagccgcccgggtccccaggacagtgctgccctttgaagccatgccccagcgtccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgaggacctgcacctggaagtacaccagaccttccaggaact[g/a]gggcccattttcaggtaaagccctccctggcccacgctGGGAACACCCAGAGCCCT	285
CYP11B 1u4	CYP11 B1	C	A	F	L	cds	GE577	GAATGGGCCTG AATGGC	CTCCAGGGTCT CTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctgtgcagaggttcctcccgatggtggatgcagtggccagggactt[c/a]tcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccacatgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B 1u5	CYP11 B1	A	G	K	R	cds	GE577	GAATGGGCCTG AATGGC	CTCCAGGGTCT CTGAGGCTG	GAATGGGCCTGAATGGCgcttcaaccgattgcggctgaatccagaagtgctgtcgcccaacgctgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctga[a/g]gaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccacatgggaagatcCAGCCTCAGAGACCCTGGAG	246
CYP11B 1u6	CYP11 B1	C	T	T	I	cds	GE625	GGAGGCAGCCA GGAGGC	GTGTCCCTTCC CCATAGCAC	GGAGGCAGCCAGGAGGCccggggctgccttgtgctcagcagtgcatcctccccgaagccagcaacttggctcttttggagagcggctgggcctggttggccacagccccaagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctgga[c/t]cagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcaGTGCTATGGGGAAGGGACAC	307
CYP11B 1u7	CYP11 B1	G	A	A	A	cds	GE570	TCCCAGCACCA AAGTCTGAG	GGCATCACCCT CTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaatctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggc[g/a]gagctcctgttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccggcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B 1u8	CYP11 B1	G	A	-	-	noncoding	GE570	TCCCAGCACCA AAGTCTGAG	GGCATCACCCT CTCTGGGT	TCCCAGCACCAAAGTCTGAGggctgcctcccgctccccggataggcgacaactgtatccagaaaatctatcaggaactggccttcagccgccctcaacagtacaccagcatcgtggcggagctcctgttgaatgcggaactgtcgccagatgccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggcc[g/a]gcaaccagccccACCCAGAGAGGGTGATGCC	243
CYP11B 1u9	CYP11 B1	A	G	N	D	cds	GE582	CTCCTGTGCAA GGTCTG	CTCCAGCAGGG GGCCAG	CTCCTGTGCAAGGTCTGaccctgcagctgtgtctcctgcagacggtgtttcccttgctgatgaacgctctttgagctggctcggaacccc[a/g]acgtgcagcaggccctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctnccccttgctgcgtgcggccctcaaggagaccttgcggtgggtgctggctgaggcctccctgtggccCTGGCCCCCTGCTGGAG	261
CYP11B 2d22	CYP11 B2	C	T	-	-	noncoding	GE1213	GAGGACTGAAG GGAGTGTG	CCACTGGGTGG TGGAGA	GAGGACTGAAGGGAGTGTGgggaggcagccaggaggcccggggctgccttgtgctcagcagtgcatcctccccgcagccagcaacttagctcttttggagagcggctgggcctggttggccacagccccagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggatcagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggacaccatgggggcccaatttctcc[c/t]TCTCCACCACCCAGTGG	364

FIG. 5O

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 2d23	CYP11 B2	G	A	-	-	noncoding	GE533	CATCCAGCTGA GGACCCTTT	ACTGGGGAGGG AGGTTCTC	CATCCAGCTGAGGACCCTTTct[g/a]tggatgcccccacctccaggctctaccctgtgggtctgttttggagcgagtggtgagctcagacttggtgcttcagaactaccacatcccagctggggtgagtgagcccccacacccctcgagctGAGAACCTCCCTCCCCAGT	172
CYP11B 2d24	CYP11 B2	A	G	N	S	cds	GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	ATGCTTCCCAGCACCAAGATctgagggctgtcccctgctccctggacaggtgacaactgtatccagaaaatctaccaggaactggccttca[a/g]ccgccctcaacactacacaggcatcgtggcagagctcctgttgaaggcggaactgtcactagaagccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccagcaaccagccccaCCCAGAGAGGGTGATGCC	248
CYP11B 2d25	CYP11 B2	A	C	R	R	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatggcttctgtagacagcgtttcccttgctgatgacgctctttgagctggctcggaaccccgacgtgcagcagatcctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctgcccttgctgcgggcggccctcaaggagaccttg[a/c]ggtgggtgctggatgaggcctccctgtggccCTGGCCCCCTGCTGGAG	264
CYP11B 2d26	CYP11 B2	G	A	-	-	noncoding	GE610	CCTGTGTCTTG CTGGGG	CAGGGTCTCTG GGGCTG	CCTGTGTCTTGCTGGGGcggcctcacaagctctgccctggcctctgtaggaatgggcctgaatggcgcttcaaccgattgcggctgaacccagatgtgctgtcgcccaaggccgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctgaagaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccatgcgggaag[g/a]tcCAGCCCCAGAGACCCTG	292
CYP11B 2u1	CYP11 B2	A	G	K	R	cds	GE610	CCTGTGTCTTG CTGGGG	CAGGGTCTCTG GGGCTG	CCTGTGTCTTGCTGGGGcggcctcacaagctctgccctggcctctgtaggaatgggcctgaatggcgcttcaaccgattgcggctgaacccagatgtgctgtcgcccaaggccgtgcagaggttcctcccgatggtggatgcagtggccagggacttctcccaggccctga[a/g]gaagaaggtgctgcagaacgcccgggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccatgcgggaaggtcCAGCCCCAGAGACCCTG	292
CYP11B 2u10	CYP11 B2	G	T	R	R	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatggcttctgtagacagcgtttcccttgctgatgacgctctttgagctggctcggaaccccgacgtgcagcagatcctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctgcccttgctgcg[g/t]gcggccctcaaggagaccttgaggtgggtgctggatgaggcctccctgtggccCTGGCCCCCTGCTGGAG	264
CYP11B 2u11	CYP11 B2	G	A	A	T	cds	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtggagggagcattggaatggcactcagggcaaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactgggcactagagcc[g/a]ctcgggcccctaggacggtgctgccgtttgaagccatgccccagcatccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatgcaccagaccttccaggagctggggcccattttcaggtaaagccctccctggccctcgctGGGAACACCCAGATCCCT	337
CYP11B 2u12	CYP11 B2	G	A	P	P	cds	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtggagggagcattggaatggcactcagggcaaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactgggcactagagccgctcgggcccctaggacggtgctgcc[g/a]tttgaagccatgccccagcatccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatgcaccagaccttccaggagctggggcccattttcaggtaaagccctccctggccctcgctGGGAACACCCAGATCCCT	337
CYP11B 2u13	CYP11 B2	A	G	A	A	cds	GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	ATGCTTCCCAGCACCAAGATctgagggctgtcccctgctccctggacaggtgacaactgtatccagaaaatctaccaggaactggccttcaaccgccctcaacactacacaggcatcgtggc[a/g]gagctcctgttgaaggcggaactgtcactagaagccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccagcaaccagccccaCCCAGAGAGGGTGATGCC	248

FIG. 5P

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 2u14	CYP11 B2	T	C	V	A	cds	GE533	CATCCAGCTGA GGACCCTTT	ACTGGGGAGGG AGGTTCTC	CATCCAGCTGAGGACCCTTTctgtggatgcccccacctccaggctctaccctgtgggtctgtttttggagcgagtgg[t/c]gagctcagacttggtgcttcagaactaccacatcccagctggggtgagtgagcccccacacccctcgagctGAGAACCTCCCTCCCCAGT	172
CYP11B 2u15	CYP11 B2	A	C	T	P	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacacccctcgagctgagaacctccctccccagtcattccctgatccctgctctgcaccgtccgcag[a/c]cattggtacaggtttcctctactcgctgggtcgcaatgccgccttgttcccgaggcctgagcggtataatccccagcgctggctagacatcaggggctccggcaggaacttccaccacgtgccctttggctttggcatgcgccagtgcctcgggcggcgcctggcagaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctgggcagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u16	CYP11 B2	T	A	L	Q	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacacccctcgagctgagaacctccctccccagtcattccctgatccctgctctgcaccgtccgcagacattggtacaggtttcctctactcgctgggtcgcaatgccgccttgttcccgaggcctgagcggtataatccccagcgctggc[t/a]agacatcaggggctccggcaggaacttccaccacgtgccctttggctttggcatgcgccagtgcctcgggcggcgcctggcagaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctgggcagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u17	CYP11 B2	G	A	V	M	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacacccctcgagctgagaacctccctccccagtcattccctgatccctgctctgcaccgtccgcagacattggtacaggtttcctctactcgctgggtcgcaatgccgccttgttcccgaggcctgagcggtataatccccagcgctggctagacatcaggggctccggcaggaacttccaccac[g/a]tgccctttggctttggcatgcgccagtgcctcgggcggcgcctggcagaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctgggcagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u18	CYP11 B2	G	A	-	-	noncoding	GE652	CATGGGCTACT GACCAGGC	CAGGCTGCAGG AGGGAA	CATGGGCTACTGACCAGGCcagatggaaacccagcctctgtcctaggtgctgaagcacttcctggtggagacactaactcaagaggacataaagatggtctacagcttcatattgaggcctggcacgtcccccctcctcactttcagagcgattaactagtcttgcatctgcacccagggtcccagcctggccaccagcttccctctgcctgaccccaggccacctgtcttctctcccac[g/a]tgcacagcttcctgagtcacccctctgtccagccagctcctgcacaaatggaactccccagggcctccaggactggggcttgccaggcttgtcaaatagcaaggccagggcacagctggagacgatcttgctggcagggcctggccttgtccccagccccacctggccccttctccagcaagcagtgccctctggacagcttgactctactcctcccagcgctggctccaggctcctcatgaggccatgcaagggtgctgtgatttgtcccttgccttcctgcctagtctcacatgtccctgtccctctcgccctggccagggcctctgtgcagacagtgtcagagtcattaagcgggatcccagcatctcagagtccagtcaagTTCCCTCCTGCAGCCTG	648
CYP11B 2u19	CYP11 B2	G	C	-	-	noncoding	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtg[g/c]agggagcattggaatggcactcagggcaaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactgggcactagagccgctcgggcccctaggacggtgctgccgtttgaagccatgccccagcatccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatgcaccagaccttccaggagctggggcccattttcaggtaaagccctccctggccctcgctGGGAACACCCAGATCCCT	337
CYP11B 2u2	CYP11 B2	A	G	K	K	cds	GE1213	GAGGACTGAAG GGAGTGTG	CCACTGGGTGG TGGAGA	GAGGACTGAAGGGAGTGTGggaggcagccaggaggcccggggctgccttgtgctcagcagtgcatcctccccgcagccagcaacttagctcttttggagagcggctgggcctggttggccacagccccagttctgccagcctgaacttcctccatgccctggaggtcatgttcaa[a/g]tccaccgtccagctcatgttcatgcccaggagcctgtctcgctggatcagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggacaccatgggggcccaatttctcccTCTCCACCACCCAGTGG	364

FIG. 5Q

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B 2u20	CYP11 B2	G	C	L	L	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatggcttctgtagacagcgtttcccttgctgatgacgctctttgagctggctcggaaccccgacgtgcagcagatcctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagct[g/c]cccttgctgcgggcggccctcaaggagaccttgaggtgggtgctggatgaggcctccctgtggccCTGGCCCCCTGCTGGAG	264
CYP11B 2u21	CYP11 B2	A	C	S	R	cds	GE652	CATGGGCTACT GACCAGGC	CAGGCTGCAGG AGGGAA	CATGGGCTACTGACCAGGCcagatggaaacccagcctctgtcctaggtgctgaagcacttcctggtggagacactaactcaagaggacataaagatggtctac[a/c]gcttcatattgaggcctggcacgtccccctcctcactttcagagcgattaactagtcttgcatctgcacccagggtcccagcctggccaccagcttccctctgcctgaccccaggccacctgtcttctctcccacgtgcacagcttcctgagtcacccctctgtccagccagctcctgcacaaatggaactccccagggcctccaggactggggcttgccaggcttgtcaaatagcaaggccagggcacagctggagacgatcttgctggcagggcctggccttgtccccagccccacctggccccttctccagcaagcagtgccctctggacagcttgactctactcctcccagcgctggctccaggctcctcatgaggccatgcaagggtgctgtgatttgtcccttgccttcctgcctagtctcacatgtccctgtccctctcgccctggccagggcctctgtgcagacagtgtcagagtcattaagcgggatcccagcatctcagagtccagtcaagTTCCCTCCTGCAGCCTG	648
CYP11B 2u3	CYP11 B2	C	G	A	A	cds	GE1213	GAGGACTGAAG GGAGTGTG	CCACTGGGTGG TGGAGA	GAGGACTGAAGGGAGTGTGgggaggcagccaggaggcccggggctgccttgtgctcagcagtgcatcctccccgcagccagcaacttagctcttttggagagcggctgggcctggttggccacagccccagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctggatcagccccaaggtgtggaaggagcactttgaggc[c/g]tgggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggacaccatgggggcccaatttctcccTCTCCACCACCCAGTGG	364
CYP11B 2u4	CYP11 B2	G	A	A	A	cds	GE587	ATGCTTCCCAG CACCAAGAT	GGCATCACCCT CTCTGGG	ATGCTTCCCAGCACCAAGATctgagggctgtcccctgctccctggacaggtgacaactgtatccagaaaatctaccaggaactggccttcaaccgccctcaacactacacaggcatcgtggcagagctcctgttgaaggc[g/a]gaactgtcactagaagccatcaaggccaactctatggaactcactgcagggagcgtggacacggtcaggccagcaaccagccccaCCCAGAGAGGGTGATGCC	248
CYP11B 2u5	CYP11 B2	T	C	I	T	cds	GE588	GAGTCCTCCTG TGCAAGGTC	CTCCAGCAGGG GGCCAG	GAGTCCTCCTGTGCAAGGTCagaccctgcagacatggcttctgtagacagcgtttcccttgctgatgacgctctttgagctggctcggaaccccgacgtgcagcaga[t/c]cctgcgccaggagagcctggccgccgcagccagcatcagtgaacatccccagaaggcaaccaccgagctgcccttgctgcgggcggccctcaaggagaccttgaggtgggtgctggatgaggcctccctgtggccCTGGCCCCCTGCTGGAG	264
CYP11B 2u6	CYP11 B2	G	A	G	S	cds	GE1214	CCAGCTGGGGT GAGTGAG	CCAGTGTGCAG GTCCCG	CCAGCTGGGGTGAGTGAGcccccacacccctcgagctgagaacctccctccccagtcattccctgatccctgctctgcaccgtccgcagacattggtacaggtttcctctactcgctgggtcgcaatgccgccttgttcccgaggcctgagcggtataatccccagcgctggctagacatcaggggctcc[g/a]gcaggaacttccaccacgtgccctttggctttggcatgcgccagtgcctcgggcggcgcctggcagaggcagagatgctgctgctgctgcaccacgtaagcaggcctgggggcgggggcgggacctgggcagcagaggCGGGACCTGCACACTGG	351
CYP11B 2u7	CYP11 B2	G	A	R	Q	cds	GE637	TCCTGGGTGAG ATAAAAGGATT T	AGGGATCTGGG TGTTCCC	TCCTGGGTGAGATAAAAGGATTTgggctgaacagggtggagggagcattggaatggcactcagggcaaaggcagaggtgtgcgtggcagcgccctggctgtccctgcaaagggcacgggcactgggcactagagccgctc[g/a]ggcccctaggacggtgctgccgtttgaagccatgccccagcatccaggcaacaggtggctgaggctgctgcagatctggagggagcagggttatgagcacctgcacctggagatgcaccagaccttccaggagctggggcccatttcaggtaaagccctccctggccctcgctGGGAACACCCAGATCCCT	337

FIG. 5R

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP11B2u8	CYP11B2	C	T	F	F	cds	GE610	CCTGTGTCTTGCTGGGG	CAGGGTCTCTGGGCTG	CCTGTGTCTTGCTGGGGcggcctcacaagctctgccctggcctctgtaggaatgggcctgaatggcgcttcaaccgattgcggctgaacccagatgtgctgtcgcccaaggccgtgcagaggttcctcccgatggtggatgcagtggccagggactt[c/t]tcccaggccctgaagaagaaggtgctgcagaacgcccggggggagcctgaccctggacgtccagcccagcatcttccactacaccatagaaggtgtgggccatgcgggaaggtcCAGCCCCAGAGACCCTG	292
CYP11B2u9	CYP11B2	T	C	I	T	cds	GE1213	GAGGACTGAAGGGAGTGTG	CCACTGGGTGGTGGAGA	GAGGACTGAAGGGAGTGTGgggaggcagccaggaggcccggggctgccttgtgctcagcagtgcatcctccccgcagccagcaacttagctctttttggagagcggctgggcctggttggccacagccccagttctgccagcctgaacttcctccatgccctggaggtcatgttcaaatccaccgtccagctcatgttcatgcccaggagcctgtctcgctgga[t/c]cagccccaaggtgtggaaggagcactttgaggcctgggactgcatcttccagtacggtgaggccagggacccgggcagtgctatggggaagggacaccatgggggcccaatttctccctCTCCACCACCCAGTGG	364
CYP17u1	CYP17	C	T	H	H	cds	GE626	CTTCTACTCCACTGCTGTCTATC	GGGCACCACTTACCATT	CTTCTACTCCACTGCTGTCTATCttgcctgccggcacccagccaccatgtgggagctcgtggctctcttgctgcttaccctagcttatttgttttggcccaagagaaggtgccctggtgccaagtaccccaagagcctcctgtccctgcccctggtgggcagcctgccattcctccccagaca[c/t]ggccatatgcataacaacttcttcaagctgcagaaaaaatatggccccatctattcggttcgtatgggcaccaagactacagtgattgtcggccaccaccagctggccaaggaggtgcttattaagaagggcaaggacttctctgggcggcctcaAATGGTAAGTGGTGCCC	360
CYP17u2	CYP17	G	T	S	S	cds	GE626	CTTCTACTCCACTGCTGTCTATC	GGGCACCACTTACCATT	CTTCTACTCCACTGCTGTCTATCttgcctgccggcacccagccaccatgtgggagctcgtggctctcttgctgcttaccctagcttatttgttttggcccaagagaaggtgccctggtgccaagtaccccaagagcctcctgtccctgcccctggtgggcagcctgccattcctccccagacacggccatatgcataacaacttcttcaagctgcagaaaaaatatggccccatctattc[g/t]gttcgtatgggcaccaagactacagtgattgtcggccaccaccagctggccaaggaggtgcttattaagaagggcaaggacttctctgggcggcctcaAATGGTAAGTGGTGCCC	360
CYP17u3	CYP17	G	A	P	P	cds	GE641	CCTTGCCTGCAGAGCGT	GGGCCACATAGGGTGGA	CCTTGCCTGCAGAGCGTttcttgaatccagcggggacccagctcatctcacc[g/a]tcagtaagctatttgcccttcggagcaggacctcgctcctgtataggtgagatcctggcccgccaggagctcttcctcatcatggcctggctgctgcagaggttcgacctggaggtgccagatgatgggcagctgccctccctggaaggcatccccaaggtggtctttctgatcgactctttcaaagtgaagatcaaggtgcgccaggcctggagggaagcccaggctgagggtagcacctaaaggctgtaactcacagcccctgTCCACCCTATGTGGCCC	339
CYP17u4	CYP17	T	A	L	Q	cds	GE626	CTTCTACTCCACTGCTGTCTATC	GGGCACCACTTACCATT	CTTCTACTCCACTGCTGTCTATCttgcctgccggcacccagccaccatgtgggagctcgtggctctcttgctgcttaccctagcttatttgttttggcccaagagaaggtgccctggtgccaagtaccccaagagcctcctgtccctgcccctggtgggcagcctgccattcctccccagacacggccatatgcataacaacttcttcaagctgcagaaaaaatatggccccatctattcggttcgtatgggcaccaagactacagtgattgtcggccaccaccagc[t/a]ggccaaggaggtgcttattaagaagggcaaggacttctctgggcggcctcaAATGGTAAGTGGTGCCC	360
CYP17u5	CYP17	C	T	S	F	cds	GE520	TCTCTAAAGGCAACTCTAGACATC	CTGGCACTCACTGATCTTC	TCTCTAAAGGCAACTCTAGACATCgcgtccaacaaccgtaagggtatcgccttcgctgact[c/t]tggcgcacactggcagctgcatcgaaggctggcgatggccacctttgccctgttcaaggatggcgatcagaagctggaGAAGATCAGTGAGTGCCAG	163
CYP17u6	CYP17	G	A	G	D	cds	GE520	TCTCTAAAGGCAACTCTAGACATC	CTGGCACTCACTGATCTTC	TCTCTAAAGGCAACTCTAGACATCgcgtccaacaaccgtaagggtatcgccttcgctgactctg[g/a]cgcacactggcagctgcatcgaaggctggcgatggccacctttgccctgttcaaggatggcgatcagaagctggaGAAGATCAGTGAGTGCCAG	163

FIG. 5S

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP17u 7	CYP17	C	A	T	N	cds	GE579	TCACCCAACCCAGGAGA	GGGGGAAGCACACCTGA	TCACCCAACCCAGGAGAaattccggagtgactctatcaccaacatgctggacacactgatgcaagccaagatgaactcagataatggcaatgctggcccagatcaagactcagagctgctttcagataaccacattctcaccaccataggggacatctttggggctggcgtggagaccacca[c/a]ctctgtggttaaatggaccctggccttcctgctgcacaatccTCAGGTGTGCTTCCCCC	246
CYP17u 8	CYP17	T	A	S	T	cds	GE579	TCACCCAACCCAGGAGA	GGGGGAAGCACACCTGA	TCACCCAACCCAGGAGAaattccggagtgactctatcaccaacatgctggacacactgatgcaagccaagatgaactcagataatggcaatgctggcccagatcaagactcagagctgctttcagataaccacattctcaccaccataggggacatctttggggctggcgtggagaccaccacc[t/a]ctgtggttaaatggaccctggccttcctgctgcacaatccTCAGGTGTGCTTCCCCC	246
CYP21d 20	CYP21	C	T	Q	*	cds	GE1218	GAGCGGCTGGAGGCTGG	GCTGGAGTTAGAGGCTGGC	GAGCGGCTGGAGGCTGGcagctgtgggctgctggggcaggactccacccgatcattccccagattcagcagcgactg[c/t]aggaggagctagaccacgaactgggccctggtgcctccagctcccgggtcccctacaaggaccgtgcacggctgcccttgctcaatgccaccatcgccgaggtgctgcgcctgcggcccgttgtgcccttagccttgccccaccgcaccacacggcccagcaggtgactcnccgagggttggggatgagtgaggaaagcccgagcccagggaggtcctgGCCAGCCTCTAACTCCAGC	321
CYP21d 21	CYP21	G	A	-	-	noncoding	GE1218	GAGCGGCTGGAGGCTGG	GCTGGAGTTAGAGGCTGGC	GAGCGGCTGGAGGCTGGcagctgtgggctgctggggcaggactccacccgatcattccccagattcagcagcgactgcaggaggagctagaccacgaactgggccctggtgcctccagctcccgggtcccctacaaggaccgtgcacggctgcccttgctcaatgccaccatcgccgaggtgctgcgcctgcggcccgttgtgcccttagccttgccccaccgcaccacacggcccagcaggtgactcnccgagggttgggatgagtgaggaaagcccgagcccagggag[g/a]tcctgGCCAGCCTCTAACTCCAGC	321
CYP21d 22	CYP21	G	A	-	-	noncoding	GE1227	CTCAGGCCCACCCCCAG	CAGGAAGCATGAGAATGCAG	CTCAGGCCCACCCCCAGcccctccctgagcctctccttgtcctgaactgaaagtactccctccttttctggcaggacgacaacttaatgcctgcctattacaaatgtatccaggaggtgttaaaaacctggagccactggtccatccaaattgtggacgtgattccctttctcagggtgaggacctggagcctagacacccctgg[g/a]ttgtaggggagaggctggggtggagggagaggctccttcccacagCTGCATTCTCATGCTTCCTG	275
CYP21d 23	CYP21	A	G	-	-	noncoding	GE1227	CTCAGGCCCACCCCCAG	CAGGAAGCATGAGAATGCAG	CTCAGGCCCACCCCCAGcccctccctgagcctctccttgtcctgaactgaaagtactccctccttttctggcaggacgacaacttaatgcctgcctattacaaatgtatccaggaggtgttaaaaacctggagccactggtccatccaaattgtggacgtgattccctttctcaggtgaggacctggagcctagacacccctgggttgt[a/g]gggagaggctggggtggagggagaggctccttcccacagCTGCATTCTCATGCTTCCTG	275
CYP21d 24	CYP21	G	A	-	-	noncoding	GE544	CCGAGCCCAGGGAGGTC	AGCCTCCACCACATTTT	CCGAGCCCAGGGAGGTCctggccagcctctaactccagccccttcagcatctccggctacgacatccctgagggcacagtcatcattccgaacctccaaggcgcccacctggatgagacggtctgggagaggccacatgagttctggcctggtatgtgggggccgggggcctgcc[g/a]tgAAAATGTGGTGGAGGCT	201
CYP21d 25	CYP21	T	C	-	-	noncoding	GE546	AGGGTCCTCTCTCCGCTG	AGCATAGCAAGAACCCATCTC	AGGGTCCTCTCTCCGCTGacgctgctttggctgtctcccagatgtggtggtgctgaactccaagaggaccattgaggaagccatggtcaaaaagtgggcagactttgctggcagacctgagccacttacctgtaagggc[t/c]gggggcatttttctttcttaaaaaattttttttaaGAGATGGGTTCTTGCTATGCT	203
CYP21d 26	CYP21	A	C	-	-	noncoding	GE546	AGGGTCCTCTCTCCGCTG	AGCATAGCAAGAACCCATCTC	AGGGTCCTCTCTCCGCTGacgctgctttggctgtctcccagatgtggtggtgctgaactccaagaggaccattgaggaagccatggtcaaaaagtgggcagactttgctggcagacctgagccacttacctgtaagggctggggcatttttctttcttaaa[a/c]aaattttttttaaGAGATGGGTTCTTGCTATGCT	203

FIG. 5T

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP21d 27	CYP21	C	T	P	L	cds	GE612	CTCTTGAGCTATAAGTGGCACC	CCTCCTATGGTGAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctgctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcctccacctcc[c/t]gcctcttgccccgggcttcttgcacttgctgcagcccgacctcccaatctatctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagaggctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21d 28	CYP21	A	C	P	P	cds	GE612	CTCTTGAGCTATAAGTGGCACC	CCTCCTATGGTGAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctgctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcctccacctcccgcctcttgccccgggcttcttgcacttgctgcagcccgacctccc[a/c]atctatctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagaggctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21d 29	CYP21	C	T	-	-	noncoding	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcc[c/t]gctcctttcaccctctgcaggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccgagcatggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 1	CYP21	T	C	L	L	cds	GE612	CTCTTGAGCTATAAGTGGCACC	CCTCCTATGGTGAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctgctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcctccacctcccgcctcttgccccgggcttcttgcac[t/c]tgctgcagcccgacctcccaatctatctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagaggctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21u 10	CYP21	C	T	P	L	cds	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcaggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagc[c/t]gagcatggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 11	CYP21	C	T	S	S	cds	GE544	CCGAGCCCAGGGAGGTC	AGCCTCCACCACATTTT	CCGAGCCCAGGGAGGTCctggccagcctctaactccagccccttcagcatctc[c/t]ggctacgacatccctgagggcacagtcatcattccgaacctccaaggcgcccacctggatgagacggtctgggagaggccacatgagttctggcctggtatgtgggggccgggggcctgccgtgAAAATGTGGTGGAGGCT	201
CYP21u 12	CYP21	C	G	H	Q	cds	GE544	CCGAGCCCAGGGAGGTC	AGCCTCCACCACATTTT	CCGAGCCCAGGGAGGTCctggccagcctctaactccagccccttcagcatctccggctacgacatccctgagggcacagtcatcattccgaacctccaaggcgccca[c/g]ctggatgagacggtctgggagaggccacatgagttctggcctggtatgtgggggccgggggcctgccgtgAAAATGTGGTGGAGGCT	201
CYP21u 13	CYP21	G	A	A	T	cds	GE612	CTCTTGAGCTATAAGTGGCACC	CCTCCTATGGTGAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtctcgccatgctgctcctgggcctgctgctgctgctgcccctgctggctggc[g/a]cccgcctgctgtggaactggtggaagctccggagcctccacctcccgcctcttgccccgggcttcttgcacttgctgcagcccgacctcccaatctatctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagaggctgatctcgctctgGCCCTCACCATAGGAGG	292
CYP21u 14	CYP21	C	T	-	-	noncoding	GE612	CTCTTGAGCTATAAGTGGCACC	CCTCCTATGGTGAGGGC	CTCTTGAGCTATAAGTGGCACCtcagggccctgacgggcgtct[c/t]gccatgctgctcctgggcctgctgctgctgctgcccctgctggctggcgcccgcctgctgtggaactggtggaagctccggagcctccacctcccgcctcttgccccgggcttcttgcacttgctgcagcccgacctcccaatctatctgcttggcctgactcagaaattcgggcccatctacaggctccaccttgggctgcaaggtgagaggctgatctcgctctgGCCCTCACCATAGGAGG	292

FIG. 5U

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP21u 15	CYP21	G	T	V	L	cds	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcaggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccgagcatggaagagggctctggacagctcctggaagggcac[g/t]tgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 16	CYP21	C	T	R	C	cds	GE1208	CTGGCCTGGTATGTGGGG	AGGGGAGGGGTTCGTACAG	CTGGCCTGGTATGTGGGGggccgggggcctgccgtgaaaatgtggtggaggctggtccccgctgccgctgaacgcctccccacccacctgtccacccgcccgcagatcgcttcctggagccaggcaagaactccagagctctggccttcggctgcggtgcccgcgtgtgcctgggcgagccgctggcg[c/t]gcctggagctcttcgtggtgctgacccgactgctgcaggccttcacgctgctgccctccggggacgccctgccctccctgcagcccctgccccactgcagtgtcatcctcaagatgcagcctttccaagtgcggctgcagcccgggggatgggggcccacagcccgggccagaaccagtgatggggcaggaccgatgccagccgggtacctcagtttctcctttattgctcCTGTACGAACCCCTCCCCT	444
CYP21u 17	CYP21	T	G	V	G	cds	GE1208	CTGGCCTGGTATGTGGGG	AGGGGAGGGGTTCGTACAG	CTGGCCTGGTATGTGGGGggccgggggcctgccgtgaaaatgtggtggaggctggtccccgctgccgctgaacgcctccccacccacctgtccacccgcccgcagatcgcttcctggagccaggcaagaactccagagctctggccttcggctgcggtgcccgcgtgtgcctgggcgagccgctggcgcgcctggagctcttcgtggtgctgacccgactgctgcaggccttcacgctgctgccctccggggacgccctgccctccctgcagcccctgccccactgcagtgtcatcctcaagatgcagcctttccaag[t/g]gcggctgcagcccgggggatgggggcccacagcccgggccagaaccagtgatggggcaggaccgatgccagccgggtacctcagtttctcctttattgctcCTGTACGAACCCCTCCCCT	444
CYP21u 18	CYP21	C	G	S	S	cds	GE576	CTTCATCAGTTCCCACCCTC	GGGGGCTACTGTGAGAGGC	CTTCATCAGTTCCCACCCTCcagcccccacctcctcctgcagacaagctggtgtctaggaactacccggacctgtc[c/g]ttgggagactactccctgctctggaaagcccacaagaagctcacccgctcagccctgctgctgggcatccgtgactccatggagccagtggtggagcagctgacccaggagttctgtgaggtaaggctgggctcctgaggccacctcgggtcagccttGCCTCTCACAGTAGCCCCC	258
CYP21u 19	CYP21	G	T	G	C	cds	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcaggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccgagcatggaagag[g/t]gctctggacagctcctggaagggcacgtgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 2	CYP21	G	C	S	T	cds	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcaggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccga[g/c]catggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 3	CYP21	T	C	S	S	cds	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcaggagagcctcgtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccgagcatggaagagggctc[t/c]ggacagctcctggaagggcacgtgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
CYP21u 4	CYP21	C	T	R	W	cds	GE1218	GAGCGGCTGGAGGCTGG	GCTGGAGTTAGAGGCTGGC	GAGCGGCTGGAGGCTGGgcagctgtgggctgctggggcaggactccacccgatcattccccagattcagcagcgactgcaggaggagctagaccacgaactgggccctggtgcctccagctcccgggtcccctacaaggaccgtgcacggctgcccttgctcaatgccaccatcgccgaggtgctgcgcctg[c/t]ggcccgttgtgcccttagccttgccccaccgcaccacacggcccagcaggtgactcnccgagggttggggatgagtgaggaaagcccgagcccagggaggtcctgGCCAGCCTCTAACTCCAGC	321

FIG. 5V

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
CYP21u5	CYP21	A	G	N	S	cds	GE1208	CTGGCCTGGTATGTGGGG	AGGGGAGGGGTTCGTACAG	CTGGCCTGGTATGTGGGGggccgggggcctgccgtgaaaatgtggtggaggctggtccccgctgccgctgaacgcctccccacccacctgtccacccgcccgcagatcgcttcctggagccaggcaagaactccagagctctggccttcggctgcggtgcccgcgtgtgcctgggcgagccgctggcgcgcctggagctcttcgtggtgctgacccgactgctgcaggccttcacgctgctgccctccggggacgccctgccctccctgcagcccctgccccactgcagtgtcatcctcaagatgcagcctttccaagtgcggctgcagccccgggggatgggggcccacagcccgggccaga[a/g]ccagtgatggggcaggaccgatgccagccgggtacctcagtttctcctttattgctcCTGTACGAACCCCTCCCCT	444
CYP21u6	CYP21	G	A	R	K	cds	GE576	CTTCATCAGTTCCCACCCTC	GGGGCTACTGTGAGAGGC	CTTCATCAGTTCCCACCCTCcagcccccacctcctcctgcagacaagctggtgtcta[g/a]gaactacccggacctgtccttgggagactactccctgctctggaaagcccacaagaagctcacccgctcagccctgctgctgggcatccgtgactccatggagccagtggtggagcagctgacccaggagttctgtgaggtaaggctgggctcctgaggccacctcgggtcagccttGCCTCTCACAGTAGCCCCC	258
CYP21u7	CYP21	T	A	I	N	cds	GE1225	CCACCTCGGGTCAGCCT	GCCAGAAAAGGAGGGAGTA	CCACCTCGGGTCAGCCTtgcctctcacagtagccccgccctgcccgctgcacagcggcctgctgaactcacactgtttctccacagcgcatgagagcccagcccggcacccctgtggccattgaggagaattctctcctcacctgcagcatca[t/a]ctgttacctcaccttcggagacaagatcaaggtgcctcacagcccctcaggcccacccccagcccctccctgagcctctccttgtcctgaactgaaagTACTCCCTCCTTTTCTGGC	279
CYP21u8	CYP21	T	A	M	K	cds	GE537	GAGAGGCTCCTTCCCACA	CTGTGGGCCGAGGGGAG	GAGAGGCTCCTTCCCACAgctgcattctcatgcttcctgccgcagttcttccccaatccaggtctccggaggctgaagcaggccatagagaagagggatcacatcgtggaga[t/a]gcagctgaggcagcacaaggtggggactgtacgtggacggcCTCCCCTCGGCCCACAG	175
CYP21u9	CYP21	C	G	L	L	cds	GE629	TGTTGCCACTCTGTACTCCTCTC	GTTGCTGGGAAGGAGCC	TGTTGCCACTCTGTACTCCTCTCcccaggccagccgctcagcccgctcctttcaccctctgcaggagagcct[c/g]gtggcaggccagtggagggacatgatggactacatgctccaaggggtggcgcagccgagcatggaagagggctctggacagctcctggaagggcacgtgcacatggctgcagtggacctcctgatcggtggcactgagaccacagcaaacaccctctcctgggccgtggtttttttgcttcaccaccctgaggtgcgtcctggggacaagcaaaaGGCTCCTTCCCAGCAAC	309
DBHu1	DBH	G	T	A	S	cds	GE991	CCCACACAGGCATTTTA	GCCGCCTACCTTCTATC	CCCACACAGGCATTTTActacccagaggaagccggcctt[g/t]ccttcgggggtccaggtcctccagatatctccgcctggaagttcactaccacaacccactggtGATAGAAGGTAGGCGGC	125
DBHu2	DBH	C	T	R	C	cds	GE1034	CCCCACCAGGTTCAACA	GCAGCGCACCTGGAAGC	CCCCACCAGGTTCAACAacgaggatgtctgcacctgccctcaggcgtccgtgtctcagcagttcacctctgttccctggaactccttcaac[c/t]gcgacgtactgaaggccctgtacagcttcgcgcccatctccatgcactgcaacaagtcctcagccgtccGCTTCCAGGTGCGCTGC	182
DBHu3	DBH	G	C	G	A	cds	GE1294	CAGGTGGGACCAGAGAGC	GCAGTGTCCCCATCGGT	CAGGTGGGACCAGAGAGCtcaccccagccatgcccgccctcagtcgctgggccagcctgcccggccccagcatgcgggaggcagccttcatgtacagcacagcagtggccatcttcctggtcatcctggtggccgcactgcagggctcggctccccgtgagagcccccctcccctatcacatccccctggacccggaggggtccctggagctctcatggaatgtcagctacacccaggaggccatccatttccagctcctggtgcggaggctcaaggctggcgtcctgtttg[g/c]gatgtccgaccgtggcgagcttgagaacgcagatctcgtggtgctctggACCGATGGGGACACTGC	362
DBHu4	DBH	T	C	V	A	cds	GE1034	CCCCACCAGGTTCAACA	GCAGCGCACCTGGAAGC	CCCCACCAGGTTCAACAacgaggatgtctgcacctgccctcaggcgtccgtgtctcagcagttcacctctg[t/c]tccctggaactccttcaaccgcgacgtactgaaggccctgtacagcttcgcgcccatctccatgcactgcaacaagtcctcagccgtccGCTTCCAGGTGCGCTGC	182
DBHu5	DBH	C	G	A	A	cds	GE1034	CCCCACCAGGTTCAACA	GCAGCGCACCTGGAAGC	CCCCACCAGGTTCAACAacgaggatgtctgcacctgccctcaggcgtccgtgtctcagcagttcacctctgttccctggaactccttcaaccgcgacgtactgaaggc[c/g]ctgtacagcttcgcgcccatctccatgcactgcaacaagtcctcagccgtccGCTTCCAGGTGCGCTGC	182
DBHu6	DBH	G	A	T	T	cds	GE966	TTTCCTCAGGGAGATGTG	CTTACCACTGTGGCCAGCTC	TTTCCTCAGGGAGATGTGctcatcacctcctgcacgtacaacac[g/a]gaagaccggGAGCTGGCCACAGTGGTAAG	78

FIG. 5W

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD1d11	DRD1	A	G	-	-	noncoding	GE1173	CTGACCCCTATTCCCTGCTT	CTCTCCAAGGCCGCAATG	CTGACCCCTATTCCCTGCTT[a/g]ggaacttgaggggtgtcagagcccctgatgtgctttctct taggaagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggact tctctgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaac acgctggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgt catctccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u1	DRD1	T	C	F	F	cds	GE1173	CTGACCCCTATTCCCTGCTT	CTCTCCAAGGCCGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctgagat tgctggcttctggccctttgggtccttctgtaacatctgggtggcctt[t/c]gacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u10	DRD1	G	C	G	R	cds	GE1170	GGATCTACAGGATTGCTCAGAAAC	GCAATCTCCTCTAGCTTTTGG	GGATCTACAGGATTGCTCAGAAACaaatacggcgcattgcggccttggagagggcagcagtccac gccaagaattgccagaccaccacaggtaatggaaagcctgtcgaatgttctcaaccggaaagttc ttttaagatgtccttcaaaagagaaactaaagtcctgaagactctgtcggtgatcatgggtgtgt ttgtgtgctgttggctacctttcttcatcttgaactgcattttgcccttctgtgggtctggggag acgcagcccttctgcattgattccaacacctttgacgtgtttgtgtggtttgggtgggctaattc atccttgaaccccatcatttatgcctttaatgctgattttcggaaggcattttcaaccctcttag gatgctacagactttgccctgcgacgaataatgccatagagacggtgagtatcaataacaatggg gccgcgatgttttccagccatcatgagccacga[g/c]gctccatctccaaggagtgcaatctgg tttacctgatcccacatgctgtgggctcctctgaggacctgaaaaaggaggaggcagctggcatc gccagacccttggagaagctgtccccagccctatcggtcatattggactatgacactgacgtctc tctggagaagatccaacccatcacacaaaacggtcagcacccaacctgaactcgcagatgaatcc tgccacacatgctcatcCCAAAAGCTAGAGGAGATTGC	753

FIG. 5X

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD1u2	DRD1	C	T	Y	Y	cds	GE1170	GGATCTACAGG ATTGCTCAGAA AC	GCAATCTCCTC TAGCTTTTGG	GGATCTACAGGATTGCTCAGAAACaaatacggcgcattgcggccttggagagggcagcagtccac gccaagaattgccagaccaccacaggtaatggaaagcctgtcgaatgttctcaaccggaaagttc ttttaagatgtccttcaaaagagaaactaaagtcctgaagactctgtcggtgatcatgggtgtgt ttgtgtgctgttggctacctttcttcatcttgaactgcattttgcccttctgtgggtctggggag acgcagcccttctgcattgattccaacacctttgacgtgtttgtgtggtttgggtgggctaattc atccttgaaccccatcatttatgcctttaatgctgattttcggaaggcattttcaaccctcttag gatgcta[c/t]agactttgccctgcgacgaataatgccatagagacggtgagtatcaataacaa tggggccgcgatgttttccagccatcatgagccacgaggctccatctccaaggagtgcaatctgg tttacctgatcccacatgctgtgggctcctctgaggacctgaaaaggaggaggcagctggcatc gccagacccttggagaagctgtccccagccctatcggtcatattggactatgacactgacgtctc tctggagaagatccaacccatcacacaaaacggtcagcacccaacctgaactcgcagatgaatcc tgccacacatgctcatcCCAAAAGCTAGAGGAGATTGC	753
DRD1u3	DRD1	C	G	V	V	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggt[c/g]atgccctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgaccccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u4	DRD1	C	T	P	S	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatg[c/t]cctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgaccccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770

FIG. 5Y

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD1u5	DRD1	A	C	A	A	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctgagat tgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgctcca ctgc[a/c]tccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u6	DRD1	A	G	K	E	cds	GE1170	GGATCTACAGG ATTGCTCAGAA AC	GCAATCTCCTC TAGCTTTTGG	GGATCTACAGGATTGCTCAGAAACaaatacggcgcattgcggccttggagagggcagcagtccac gccaagaattgccagaccaccacaggtaatggaaagcctgtcgaatgttctcaaccggaaagttc ttttaagatgtccttcaaaagagaaactaaagtcctgaagactctgtcggtgatcatgggtgtgt ttgtgtgctgttggctacctttcttcatcttgaactgcattttgcccttctgtgggtctggggag acgcagcccttctgcattgattccaacacctttgacgtgtttgtgtggtttgggtgggctaattc atccttgaaccccatcatttatgcctttaatgctgattttcggaaggcatttcaaccctcttag gatgctacagactttgccctgcgacgaataatgccatagagacggtgagtatcaataacaatggg gccgcgatgttttccagccatcatgagccacgaggctccatctccaaggagtgcaatctggttta cctgatcccacatgctgtgggctcctctgaggacctgaaaaaggaggaggcagctggcatcgcca gacccttggag[a/g]agctgtccccagccctatcggtcatattggactatgacactgacgtctc tctggagaagatccaacccatcacacaaaacggtcagcacccaacctgaactcgcagatgaatcc tgccacacatgctcatcCCAAAAGCTAGAGGAGATTGC	753
DRD1u7	DRD1	A	C	R	R	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccg[a/c]cacctgcggtccaaggtgaccaacttctttgt catctccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctg agattgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgc tccactgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagcttttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770

FIG. 5Z

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD1u8	DRD1	T	C	T	T	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctgagat tgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgctcca c[t/c]gcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccc tttccggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggacct tgtctgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccc tctgatggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggac atatgccatctcatcctctgtaataagctttacatccctgtggccatcatgattgtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD1u9	DRD1	T	C	I	I	cds	GE1173	CTGACCCCTAT TCCCTGCTT	CTCTCCAAGGC CGCAATG	CTGACCCCTATTCCCTGCTTaggaacttgaggggtgtcagagcccctgatgtgctttctcttagg aagatgaggactctgaacacctctgccatggacgggactgggctggtggtggagagggacttctc tgttcgtatcctcactgcctgtttcctgtcgctgctcatcctgtccacgctcctggggaacacgc tggtctgtgctgccgttatcaggttccgacacctgcggtccaaggtgaccaacttctttgtcatc tccttggctgtgtcagatctcttggtggccgtcctggtcatgccctggaaggcagtggctgagat tgctggcttctggccctttgggtccttctgtaacatctgggtggcctttgacatcatgtgctcca ctgcatccatcctcaacctctgtgtgatcagcgtggacaggtattgggctatctccagccctttc cggtatgagagaaagatgacccccaaggcagccttcatcctgatcagtgtggcatggaccttgtc tgtactcatctccttcatcccagtgcagctcagctggcacaaggcaaaacccacaagcccctctg atggaaatgccacttccctggctgagaccatagacaactgtgactccagcctcagcaggacatat gccatctcatcctctgtaataagctttacatccctgtggccatcatgat[t/c]gtcacctaca ccaggatctacaggattgctcagaaacaaatacggcgCATTGCGGCCTTGGAGAG	770
DRD2d10	DRD2	C	t	-	-	noncoding	GE1119	AATTATGGCCG GTGGGC	TCTTGGTAATG GTTAGGTGGG	AATTATGGCCGGTGGGCccgctgactccctgcctgcccgggctctccctcccccagaccagaacg agtgcatcattgccaacccggccttcgtggtctactcctccatcgtctccttctacgtgcccttc attgtcaccctgctggtctacatcaagatctacattgtcctccgcagacgccgcaagcgagtcaa caccaaacgcagcagccgagctttcagggcccacctgagggctccactaaaggt[c/t]tcaaga caccccccaaccaactccaagggtcCCCACCTAACCATTACCAAGA	306
DRD2u1	DRD2	G	C	V	L	cds	GE1119	AATTATGGCCG GTGGGC	TCTTGGTAATG GTTAGGTGGG	AATTATGGCCGGTGGGCccgctgactccctgcctgcccgggctctccctcccccagaccagaacg agtgcatcattgccaacccggccttcgtggtctactcctccatcgtctccttctacgtgcccttc attgtcaccctgctg[g/c]tctacatcaagatctacattgtcctccgcagacgccgcaagcgag tcaacaccaaacgcagcagccgagctttcagggcccacctgagggctccactaaaggtctcaaga caccccccaaccaactccaagggtcCCCACCTAACCATTACCAAGA	306
DRD2u2	DRD2	T	C	H	H	cds	GE1140	GCTGATGCCTG GGAACTT	GGAATGGGACC TTTCACA	GCTGATGCCTGGGAACTTgtccggctttacccagagccctctgcctctggtgcaggaggctgccc ggcgagcccaggagctggagatggagatgctctccagcaccagcccacccgagaggacccggtac agccccatcccacccagccaccaccagctgactctccccgacccgtcccacca[t/c]ggtctcc acagcactcccgacagccccgccaaaccagagaagaatgggcatgccaaagaccaccccaagatt gccaagatctttgagatccagaccatgcccaatggcaaaacccggacctccctcaagaccatgag ccgtaggaagctctcccagcagaaggagaagaaagccactcagatgctcgccattgttctcggtg agtcggccctggctgctggccacagncggtcTGTGAAAGGTCCCATTCC	439

FIG. 5AA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD2u3	DRD2	A	G	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggcc[a/g]gc cagccntcacccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannncc ccggcaggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgcc agggcagtgctagtgagctgggcatggtaccagccctggggctggncccccagctcaggggcag ctcatagagtccccctcccacctccagtcccctatccttggcaccaaagatgcagccgccttc cttgaccttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagtttc tctttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctctcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774
DRD2u4	DRD2	C	T	P	P	cds	GE1140	GCTGATGCCTG GGAACTT	GGAATGGGACC TTTCACA	GCTGATGCCTGGGAACTTgtccggctttacccagagccctctgcctctggtgcaggaggctgccc ggcgagcccaggagctggagatggagatgctctccagcaccagcccacccgagaggacccggtac agccccatcccacccagccaccaccagctgactctccccgacccgtcccaccatggtctccacag cactcc[c/t]gacagccccgccaaaccagagaagaatgggcatgccaaagaccaccccaagatt gccaagatctttgagatccagaccatgcccaatggcaaaacccggacctccctcaagaccatgag ccgtaggaagctctcccagcagaaggagaagaaagccactcagatgctcgccattgttctcggtg agtcggccctggctgctggccacagncggtcTGTGAAAGGTCCCATTCC	439
DRD2u5	DRD2	G	T	-	-	noncoding	GE1165	CCACAGGAGGC AAGCAAG	GACTCGTCAAA GTTTTATTAGT TTGGT	CCACAGGAGGCAAGCAAGctctcttgccgaggagccaggcaacttcagtcctgggagacccatgt aaataccagactgcaggttggaccccagagattcccaagccaaaaccttagctccctcccgcac cccgatgtggacctctactttccaggctagtccggacccacctcaccccgttacagctccccaag tggtttccacatgctctgagaagaggagccctcatcttgaagggcccaggagggtctatggggag aggaactccttggcctagcccaccct[g/t]ctgccttctgacggccctgcaatgtatcccttct cacagcacatgctggccagcctggggcctggcagggaggtcaggccctggaactctatctgggcc tgggctaggggacatcagaggttctttgagggactgcctctgccacactctgacgcaaaaccact ttcctttctattccttctggcctttcctctctcctgtttcccttcccttccactgcctctgcct tagaggagcccacggctaagaggctgctgaaaaccatctggcctggcctggccctgccctgagga aggaggggaagctgcagcttgggagagcccctggggcctagactctgtaacatcactatccnatg cACCAAACTAATAAAACTTTGACGAGTC	678
DRD2u6	DRD2	G	C	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggccagccagc cntcacccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannnccccgg caggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgccagg[g/c]cagtgctagtgagctgggcatggtaccagccctggggctggncccccagctcaggggcag ctcatagagtccccctcccacctccagtcccctatccttggcaccaaagatgcagccgccttc cttgaccttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagtttc tctttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctctcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774

FIG. 5BB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD2u7	DRD2	C	G	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggccagccagc cntcacccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannnccccgg caggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgccaggg cagtgctagtgagctgggcatggtaccagccctggggctggnccccccagctcaggggcagctca tagagtccccccctcccacctccagtccccctatccttggcaccaaagatgcagccgccttccttg accttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagttttct[c/ g]tttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctctcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774
DRD2u8	DRD2	G	A	L	L	cds	GE1088	GAGTGAGGGGT CCCTGG	CTTCGAGGGAG CAGGGG	GAGTGAGGGGTCCCTGGcctgcaccccagattcagggtcccccgccctggcaggtacacagctg tggccatgcccatgct[g/a]tacaatacgcgctacagctccaagcgccgggtcaccgtcatgat ctccatcgtctgggtcctgtccttcaccatctcctgcccactcctcttcggactcaataacgcag gtacattctgcttttgtttgcctgaggctcagctggccctgggCCCCTGCTCCCTCGAAG	255
DRD2u9	DRD2	A	G	-	-	noncoding	GE1315	GCACTGGGTGT GGGTGTT	GGTCTCCCAGG ACTGAAGTT	GCACTGGGTGTGGGTGTTcccagccgtgcctccccggctctggggaccagcctgaccatgccctc tcccccaggcgtgttcatcatctgctggctgcccttcttcatcacacacatcctgaacatacact gtgactgcaacatcccgcctgtcctgtacagcgccttcacgtggctgggctatgtcaacagcgcc gtgaaccccatcatctacaccaccttcaacattgagttccgcaaggccttcctgaagatcctcca ctgctgactctgctgcctgcccgcacagcagcctgcttcccacctccctgcccaggccagccagc cntcacccttgcgaaccgtgagcnaggaaggcctgggtggatcggcctcctcttcannnccccgg caggccctgcagtgttcgcttggctccatgctcctcactgcccgcacaccctcactctgccaggg cagtgct[a/g]gtgagctgggcatggtaccagccctggggctggnccccccagctcaggggcag ctcatagagtccccccctcccacctccagtccccctatccttggcaccaaagatgcagccgccttc cttgaccttcctctggggctctagggttgctggagcctgagtcagggcccagaggctgagtttc tctttgtggggcttggcgtggagcaggcggtggggagagatggacagttcacaccctgcaaggcc cacaggaggcaagcaagctctcttgccgaggagccaggcAACTTCAGTCCTGGGAGACC	774
DRD3u1	DRD3	A	G	S	G	cds	GE1135	CAAGCCCCAAA GAGTCTGAT	CGTCAACATGC ACCTGA	CAAGCCCCAAAGAGTCTGATtttattaatattgtttctgtctcctcacaggaagccccttggca tcacgcacctcctctgggctatggcatctctgagtcagctgagt[a/g]gccacctgaactacac ctgtggggcagagaactccacaggtgccagccaggcccgcccacatgcctactatgccctctcct actgcgcgctcatcctggccatcgtcttcggcaatggcctgctgtgcatggctgtgctgaaggag cgggccctgcagactaccaccaactacttagtagtgagcctggctgtggcagacttgctggtggc caccttggtgatgccctgggtggtatacctggaggtgagtagactTCAGGTGCATGTTGACG	387

FIG. 5CC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5d21	DRD5	C	T	H	H	cds	GE1174	GCCATCATGATCGTGACCTA	CTTGTCAGTGTCTGTGCGGT	GCCATCATGATCGTGACCTAcacgcgcatctaccgcatcgcccaggtgcagatccgcaggatttcctccctggagagggccgcagagcacgcgcagagctgccggagcagcgcagcctgcgcgcccgacaccagcctgcgcgcttccatcaagaaggagaccaaggttctcaagaccctgtcggtgatcatggggtcttcgtgtgttgctggctgcccttcttcatccttaactgcatggtccctttctgcagtggacaccccgaaggccctccggccggcttcccctgcgtcagtgagaccaccttcgacgtcttcgtctggttcggctgggctaactcctcactcaaccccgtcatctatgccttcaacgccgactttcagaaggtgtttgcccagctgctggggtgcagccacttctgctcccgcacgccggtggagacggtgaacatcagcaatgagctcatctcctacaaccaagacatcgtcttccacaaggaaatcgcagctgcctacatcca[c/t]atgatgcccaacgccgttaccccggcaaccgggaggtggacaacgacgaggaggagggtcctttcgatcgcatgttccagatctatcagacgtccccagatggtgaccctgttgctgagtctgtctgggagctggactgcgagggggagatttctttagacaaaataacacctttcaccccgaatggattccattaaactgcattaagaaacccccctcatggatctgcataACCGCACAGACACTGACAAG	778
DRD5u1	DRD5	C	T	N	N	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaa[c/t]gtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u10	DRD5	G	A	P	P	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtaccc[g/a]gggcagttcgctctataccagcagctggcgcagggaacgccgtggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacctttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5DD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u1 1	DRD5	C	G	Q	E	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccag[c/g]agctggcgcagg ggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgc ctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcg gagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacttt tcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttgga gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u1 2	DRD5	T	A	L	Q	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagc[t/a]ggcgcagg ggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgc ctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcg gagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacttt tcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttgga gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u1 3	DRD5	C	G	L	V	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtct[c/g]tggccgtgtcagacttt tcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttgga gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5EE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5ul 4	DRD5	C	T	A	A	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggc[c/t]gtgtcagaccttttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5ul 5	DRD5	T	G	L	R	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacc[t/g]tttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5ul 6	DRD5	T	C	T	T	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccac[t/c]gcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggacttttgggagcccgacgtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5FF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u17	DRD5	T	G	V	V	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtc atcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcg catggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtcc agctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggcc aactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgactccag cctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgt[t/g]gccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u18	DRD5	T	C	L	L	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagacct[t/c]t tcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttgga gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u19	DRD5	G	A	G	E	cds	GE1171	CCAGGCAGCAACGGCAC	CTGGGCGATGCGGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtggggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttg[g/a]a gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5GG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u2	DRD5	G	C	C	S	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgt[g/c]cgcagccatcgtgcg gagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttt tcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttgga gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u2 0	DRD5	G	A	R	H	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtc atcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcg catggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtcc agctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggcc aactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgactccag cctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatga tcgtgacctacacgc[g/a]cATCTACCGCATCGCCCAG	754
DRD5u3	DRD5	C	G	N	K	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaa[c/g]atgaccaacgtcttcatcgtgtctctggccgtgtcagaccttt tcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttgga gcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5HH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u4	DRD5	C	T	F	F	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggcctt[c/t]gacatcatgtgctccactgcctccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u5	DRD5	C	A	A	A	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgc[c/a]tccatcctgaacctgtg cgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u6	DRD5	C	G	V	V	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaa cgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgc tgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagc cgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgt ggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgt tctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgt[c/g]atcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactc agcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccg gtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacct ggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcagagaactgtgact ccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatc atgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754

FIG. 5II

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
DRD5u7	DRD5	C	G	D	E	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggactttgggagcccga[c/g]gtgaatgcagagaactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u8	DRD5	G	C	E	D	cds	GE1171	CCAGGCAGCAA CGGCAC	CTGGGCGATGC GGTAGAT	CCAGGCAGCAACGGCACcgcgtacccggggcagttcgctctataccagcagctggcgcaggggaacgccgtgggggctcggcgggggcaccgccactggggccctcacaggtggtcaccgcctgcctgctgaccctactcatcatctggaccctgctgggcaacgtgctggtgtgcgcagccatcgtgcggagccgccacctgcgcgccaacatgaccaacgtcttcatcgtgtctctggccgtgtcagaccttttcgtggcgctgctggtcatgccctggaaggcagtcgccgaggtggccggttactggccctttggagcgttctgcgacgtctgggtggccttcgacatcatgtgctccactgcctccatcctgaacctgtgcgtcatcagcgtggaccgctactgggccatctccaggcccttccgctacaagcgcaagatgactcagcgcatggccttggtcatggtcggcctggcatggaccttgtccatcctcatctccttcattccggtccagctcaactggcacagggaccaggcggcctcttggggcgggctggacctgccaaacaacctggccaactggacgccctgggaggaggactttgggagcccgacgtgaatgcaga[g/c]aactgtgactccagcctgaatcgaacctacgccatctcttcctcgctcatcagcttctacatccccgttgccatcatgatcgtgacctacacgcgcATCTACCGCATCGCCCAG	754
DRD5u9	DRD5	C	T	P	P	cds	GE1174	GCCATCATGAT CGTGACCTA	CTTGTCAGTGT CTGTGCGGT	GCCATCATGATCGTGACCTAcacgcgcatctaccgcatcgcccaggtgcagatccgcaggatttcctccctggagagggccgcagagcacgcgcagagctgccggagcagcgcagcctgcgcgcccgacaccagcctgcgcgcttccatcaagaaggagaccaaggttctcaagaccctgtcggtgatcatggggg tcttcgtgtgttgctggctgcccttcttcatccttaactgcatggtccctttctgcagtggacaccc[c/t]gaaggccctccggccggcttcccctgcgtcagtgagaccaccttcgacgtcttcgtctggttcggctgggctaactcctcactcaaccccgtcatctatgccttcaacgccgactttcagaaggtgtttgcccagctgctggggtgcagccacttctgctcccgcacgccggtggagacggtgaacatcagcaatgagctcatctcctacaaccaagacatcgtcttccacaaggaaatcgcagctgcctacatccacatgatgcccaacgccgttacccccggcaaccgggaggtggacaacgacgaggaggagggtcctttcgatcgcatgttccagatctatcagacgtccccagatggtgaccctgttgctgagtctgtctgggagctggactgcgagggggagatttctttagacaaaataacacctttcaccccgaatggattccattaaactgcattaagaaacccccctcatggatctgcataACCGCACAGACACTGACAAG	778
F10a9	F10	A	G	-	-	noncoding	GE913	GAGCCTGGCTT CTGGCTA	CGTGCCTCCTA CCTGTG	GAGCCTGGCTTCTGGCTAtaaaccgcactgcaccatgagcttccccgtgacccgtgaggttgcccttcaaggcaagtgtacctgtcgcctggctctggccctttgctcaacccaatggccgctttgtggctgacaggcaagtggatgtagctggcacccttgggccagcccagcctccatttctccagctgtccccagagcc[a/g]acgtgcctctcctttggcagtcacacggaagctctgcagcctggacaacggggactgtgaccagttctgccacgaggaacagaactctgtggtgtgctcctgcgcccgcggtacaccctggctgacaacggcaaggcctgcattccCACAGGTAGGAGGCACG	371

FIG. 5JJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F10d8	F10	C	T	F	F	cds	GE942	GGTTTTCAGTCAGGCAACAC	CAGACAGTGACGGTGCCC	GGTTTTCAGTCAGGCAACACnagtccacctggccagccacactgagcctgtcacgtctgtcacaggccctgctcatcaatgaggaaaacgagggtttctgtggtggaaccattctgagcgagttctacatcctaacggcagcccactgtctctaccaagccaagagatt[c/t]gaaggtgagggtaggtaagtgaccaacagcccccagggccgtggtgggGGCACCGTCACTGTCTG	240
F10u1	F10	C	T	T	T	cds	GE942	GGTTTTCAGTCAGGCAACAC	CAGACAGTGACGGTGCCC	GGTTTTCAGTCAGGCAACACnagtccacctggccagccacactgagcctgtcacgtctgtcacaggccctgctcatcaatgaggaaaacgagggtttctgtggtggaac[c/t]attctgagcgagttctacatcctaacggcagcccactgtctctaccaagccaagagattcgaaggtgagggtaggtaagtgaccaacagcccccagggccgtggtgggGGCACCGTCACTGTCTG	240
F10u2	F10	A	T	E	V	cds	GE907	GTCCCCTGGCTGAGCTG	GTGGGATCTCACTTTAATGG	GTCCCCTGGCTGAGCTGagcacagtcccactcgtctgtcccaggggaccggaacacggagcaggaggagggcggtgaggcggtgcacg[a/t]ggtggaggtggtcatcaagcacaaccggttcacaaaggagacctatgacttcgacatcgccgtgctccggctcaagacccccatcaccttccgcatgaacgtggcgcctgcctgcctccccgagcgtgactgggccgagtccacgctgatgacgcagaagacggggattgtgagcggcttcgggcgcacccacgagaagggccggcagtccaccaggctcaagatgctggaggtgccctacgtggaccgcaacagctgcaagctgtccagcagcttcatcatcacccagaacatgttctgtgccggctacgacaccaagcaggaggatgcctgccagggggacagcgggggcccgcacgtcacccgcttcaaggacacctacttcgtgacaggcatcgtcagctggggagagggctgtgcccgtaaggggaagtacgggatctacaccaaggtcaccgccttcctcaagtggatcgacaggtccatgaaaaccaggggcttgcccaaggccaagagccatgccccggaggtcataacgtcctctCCATTAAAGTGAGATCCCAC	657
F10u3	F10	C	T	A	A	cds	GE907	GTCCCCTGGCTGAGCTG	GTGGGATCTCACTTTAATGG	GTCCCCTGGCTGAGCTGagcacagtcccactcgtctgtcccaggggaccggaacacggagcaggaggagggcggtgaggcggtgcacgaggtggaggtggtcatcaagcacaaccggttcacaaaggagacctatgacttcgacatcgccgtgctccggctcaagacccccatcaccttccgcatgaacgtggcgcctgcctgcctccccgagcgtgactgggccgagtccacgctgatgacgcagaagacggggattgtgagcggcttcgggcgcacccacgagaagggccggcagtccaccaggctcaagatgctggaggtgccctacgtggaccgcaacagctgcaagctgtccagcagcttcatcatcacccagaacatgttctgtgc[c/t]ggctacgacaccaagcaggaggatgcctgccagggggacagcgggggcccgcacgtcacccgcttcaaggacacctacttcgtgacaggcatcgtcagctggggagagggctgtgcccgtaaggggaagtacgggatctacaccaaggtcaccgccttcctcaagtggatcgacaggtccatgaaaaccaggggcttgcccaaggccaagagccatgccccggaggtcataacgtcctctCCATTAAAGTGAGATCCCAC	657
F10u4	F10	G	C	Q	H	cds	GE250	CCTGCCTTCCAGTGTTCAT	CCCAGCCCTTACCGTCTTG	CCTGCCTTCCAGTGTTCATccgcagggagca[g/c]gccaacaacatcctggcgagggtcacgagggccaattcctttcttgaagagatgaagaaaggacacctcgaaagagagtgcatggaagagacctgctcatacgaagaggcccgcgaggtctttgaggacagcgaCAAGACGGTAAGGGCTGGG	189
F10u5	F10	C	T	N	N	cds	GE913	GAGCCTGGCTTCTGGCTA	CGTGCCTCCTACCTGTG	GAGCCTGGCTTCTGGCTAtaaaccgcactgcaccatgagcttccccgtgacccgtgaggttgcccttcaaggcaagtgtacctgtcgcctggctctggccctttgctcaacccaatggccgctttgtggctgacaggcaagtggatgtagctggcacccttgggccagcccagcctccatttctccagctgtccccagagccaacgtgcctctccttggcagtcacacggaagctctgcagcctggacaa[c/t]ggggactgtgaccagttctgccacgaggaacagaactctgtggtgtgctcctgcgcccgcgggtacaccctggctgacaacggcaaggcctgcattccCACAGGTAGGAGGCACG	371
F10u6	F10	C	A	L	I	cds	GE242	AGCCAGACAACAGCCATCC	GCGAGGGGCACTTACGACT	AGCCAGACAACAGCCATCCcagctggggcgtggactttgctccagcagcctgtcccagtgaggacagggacacagtactcggccacaccatggggcgcccactgcac[c/a]tcgtcctgctcagtgcctccctggctggcctcctgctgctcggggaaAGTCGTAAGTGCCCCTCGC	178

FIG. 5KK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F10u7	F10	A	T	Q	L	cds	GE913	GAGCCTGGCTTCTGGCTA	CGTGCCTCCTACCTGTG	GAGCCTGGCTTCTGGCTAtaaaccgcactgcaccatgagcttccccgtgacccgtgaggttgcccttcaaggcaagtgtacctgtcgcctggctctggccctttgctcaacccaatggccgcttgtggctgacaggcaagtggatgtagctggcacccttgggccagcccagcctccatttctccagctgtccccagagccaacgtgcctctcctttggcagtcacacggaagctctgcagcctggacaacggggactgtgacc[a/t]gttctgccacgaggaacagaactctgtggtgtgctcctgcgcccgcgggtacaccctggctgacaacggcaaggcctgcattccCACAGGTAGGAGGCACG	371
F11d17	F11	G	C	C	S	cds	GE255	TGTGCTGACTTTTAAGATCCATT	CAGCTGGTATTTGTTGATTCTG	TGTGCTGACTTTTAAGATCCATTatttaaaaacataaattcctattcattaatatgtatttttaaaaaaacaggtttacttgtgtcctgaaagacagtgttacagaaacactgccaagagtgaataggacagcagcgatttctgggtattctttcaagcaat[g/c]ctcacaccaaataagcggtaagatatgttctCAGAATCAACAAATACCAGCTG	222
F11d18	F11	C	T	I	I	cds	GE287	TGACTTTACTTTCTCTAGGTGCTG	ACCCTCCCTCAGCATGTATC	TGACTTTACTTTCTCTAGGTGCTGtaaaaatgttttatgtgtttgatatgatatatttctacttccctttgttttgttagaaatctttgtctccttaaaacatctgagagtggattgcccagtacacgcattaaaaagagcaaagctctttctggtttcagtctacaaagctgcaggcacagcat[c/t]ccaggtaaactgagagttctgcattctggctgagagtgaccagccccgaggaggctGATACATGCTGAGGGAGGGT	269
F11d19	F11	G	C	-	-	noncoding	GE319	GCCCCTAGAATCTGGAAGG	GCATAAAGTTGATGGCAAAAG	GCCCCTAGAATCTGGAAGGtactcatgtcttctgctttatttccagcttgcaacaaagacatttatgtggacctagacatgaagggcataaactataacagctcagttgccaagagtgctcaagaatgccaagaaagatgcacggatgacgtccactgccacttttcacgtacgccacaaggcagtttcccagcctggagcatcggtgagtgagtcccaggacattc[g/c]agtggtcgatgaaaaacagaatcgtgatttactaaaaagCTTTTGCCATCAACTTTATGC	294
F11d20	F11	G	C	G	R	cds	GE352	TGAGCAAGATGTGCTGAAGAT	AGCATGCTGGCACAGTGAA	TGAGCAAGATGTGCTGAAGATgggaagcgtctgagttgatctgtgcacctttttcttgtctcccctcgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggcatcacgagctggggcgaaggctgtgctcaaagggagcggcca[g/c]gtgtttacaccaacgtggtcgagtacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattggagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11d21	F11	A	G	-	-	noncoding	GE352	TGAGCAAGATGTGCTGAAGAT	AGCATGCTGGCACAGTGAA	TGAGCAAGATGTGCTGAAGATggga[a/g]gcgtctgagttgatctgtgcacctttttcttgtctcccctcgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggcatcacgagctggggcgaaggctgtgctcaaagggagcggccaggtgtttacaccaacgtggtcgagtacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattggagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11d22	F11	G	T	C	F	cds	GE356	TTCTGGCTGAGAGTGACCAG	GAAACAAAACGGTATAAACATAATGC	TTCTGGCTGAGAGTGACCAGccccgaggaggctgatacatgctgagggagggtctcactctgacatgtggtctgctgtctagtgttctgccattcttcatttaccatgacactgatttcttgggagaagaactggatattgttgctgcaaaaagtcacgaggcctgccagaaactgtgcaccaatgccgtccgctgccagtttttacctataccccagcccaagcatcct[g/t]caacgaagggaagtaagccatatgaagggttatgcagacacccttgtcccgtctgcctgtgaggtGCATTATGTTTATACCGTTTTGTTTC	328
F11u1	F11	C	T	P	L	cds	GE324	CCTTTATGAGATTACCACCTAACTAGA	TTTAAAAATCTGTCTCCTCGATGT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgtactacatcacagaatgtgtgactcagttgttgaaggacacctgctttgaaggaggggacattactacggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtttactcttcactttcacggcggaatcac[c/t]atctgaggatcccacccgatggtaaatgcttatgtttctACATCGAGGAGACAGATTTTTAAA	286

FIG. 5LL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F11u10	F11	A	G	Q	R	cds	GE928	CCTGATAGCTGGTGAATTG	TGGATTTTGATCAGCTATTTTTA	CCTGATAGCTGGTGAATTGagtccctgacatagttcttccgtcgcgc[illegible]gcttgtattagggacattttccctaatacggtgtttgcagacagcaacatcgacagtgtcatggctcccgatgcttttgtctgtggccgaatctgcactcatcatcccggttgcttgtttttaccttcttttccc[a/g]ggaatggcccaaagaatctcaaaggtaaggagttaacaagtaaggataatttgttatcttcTAAAAATAGCTGATCAAAATCCA	273
F11u11	F11	T	C	G	G	cds	GE916	TGGAAAGGAAGATGTAGGAAGC	GCAAATAAGACAATCTAATTGGTTAAAGTA	TGGAAAGGAAGATGTAGGAAGCtgctcatcacaatgcttctgttgcagagtgtaccaccaaatcaagcccaggatcgttggaggaactgcgtctgttcgtgg[t/c]gagtggccgtggcaggtgaccctgcacacaacctcacccactcagagacacctgtgtggaggctccatcattggaaaccagtggatattaacagccgctcactgtttctatgggtcagtaccacggctgttttattagttcatcttcttcacacatttataaaaaatattactagcatgttaggaaataaaTACTTTAACCAATTAGATTGTCTTATTTGC	330
F11u12	F11	G	T	R	R	cds	GE352	TGAGCAAGATGTGCTGAAGAT	AGCATGCTGGCACAGTGAA	TGAGCAAGATGTGCTGAAGATgggaagcgtctgagttgatctgtgcacctttcttgtctcccctcgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggcatcacgagctggggcgaaggctgtgctcaaagggagcg[g/t]ccaggtgtttacaccaacgtggtcgagtacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattggagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11u13	F11	T	C	V	A	cds	GE324	CCTTTATGAGATTACCACCTAACTAGA	TTTAAAAATCTGTCTCCTCGATGT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgtactacatcacagaatgtg[t/c]gactcagttgttgaaggacacctgctttgaaggaggggacattactacggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtttactcttcactttcacggcggaatcaccatctgaggatcccacccgatggtaaatgcttatgtttctACATCGAGGAGACAGATTTTTAAA	286
F11u14	F11	A	C	N	H	cds	GE321	CTCTCTCCAAAGGGGACTTTC	TGAGCATAAGCTGGTATCCTGAG	CTCTCTCCAAAGGGGACTTTCttaatatctcatgtttttcctccttgcagttggaagaataagacacttttccttttcttttattcagtaacatttgtctactgaagcacacccaaacagggacaccaaccagaataacgaagctcgataaagtggtgtctggatttcactgaaatcctgtgcactttct[a/c]atctgggtaattatcgacttcttgatgatgtaattcaaccattaaatatgctgatgattacagtagatctcaCTCAGGATACCAGCTTATGCTCA	294
F11u15	F11	A	T	I	F	cds	GE356	TTCTGGCTGAGAGTGACCAG	GAAACAAAACGGTATAAACATAATGC	TTCTGGCTGAGAGTGACCAGccccgaggaggctgatacatgctgagggagggtctcactctgacatgtggtctgctgtctagtgttctgccattcttcattttaccatgacactgatttcttgggagaagaactggat[a/t]ttgttgctgcaaaaagtcacgaggcctgccagaaactgtgcaccaatgccgtccgctgccagtttttacctataccccagcccaagcatcctgcaacgaagggaagtaagccatatgaagggttatgcagacacccttgtcccgtctgcctgtgaggtGCATTATGTTTATACCGTTTTGTTTC	328
F11u16	F11	T	A	I	K	cds	GE339	GCCACACACTTCACAATGTC	CAGGCCGTAAGTCTAGTAGTGTTAAA	GCCACACACTTCACAATGTCtgggaattattttagtaaaggaaatttcttccctctgttgtttgctccttagggtagagtcacctaagatttgcgtgtctacagtggcattttaaatcaatctgaaataaaagaggacacatctttctttggggttcaagaaataa[t/a]aatccatgatcagtataaaatggcagaaagcgggtatgatattgccttgttgaaactggaaaccacagtgaattacacaggtacggagaattttatccggaaagttgtctccaatggtgaactggataaaatgTTTAACACTACTAGACTTACGGCCTG	333
F11u2	F11	C	T	D	D	cds	GE319	GCCCCTAGAATCTGGAAGG	GCATAAAGTTGATGGCAAAAG	GCCCCTAGAATCTGGAAGGtactcatgtcttctgcttttatttccagcttgcaacaaagacatttatgtggacctagacatgaagggcataaactataacagctcagttgccaagagtgctcaagaatgccaagaaagatgcacggatga[c/t]gtccactgccacttttcacgtacgccacaaggcagtttcccagcctggagcatcggtgagtgagtcccaggacattcgagtggtcgatgaaaaacagaatcgtgatttactaaaaagCTTTTGCCATCAACTTTATGC	294

FIG. 5MM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F11u3	F11	A	G	T	T	cds	GE287	TGACTTTACTTTCTCTAGGTGCTG	ACCCTCCCTCAGCATGTATC	TGACTTTACTTTCTCTAGGTGCTGtaaaaatgtttttatgtgtttgatatgatatatttctacttccctttgtttttgttagaaatcttgtctccttaaaacatctgagagtggattgcccagtac[a/g]cgcattaaaaagagcaaagctctttctggtttcagtctacaaagctgcaggcacagcatcccaggtaaactgagagttctgcattctggctgagagtgaccagccccgaggaggctGATACATGCTGAGGGAGGGT	269
F11u4	F11	A	T	H	L	cds	GE916	TGGAAAGGAAGATGTAGGAAGC	GCAAATAAGACAATCTAATTGGTTAAAGTA	TGGAAAGGAAGATGTAGGAAGCtgctcatcacaatgcttctgttgcagagtgtaccaccaaaatcaagcccaggatcgttggaggaactgcgtctgttcgtggtgagtggccgtggcaggtgaccctgcacacaacctcacccactcagagacacctgtgtggaggctccatcattggaaaccagtggatattaacagccgctc[a/t]ctgtttctatgggtcagtaccacggctgttttattagttcatcttcttcacacatttataaaaaatattactagcatgttaggaaataaaTACTTTAACCAATTAGATTGTCTTATTTGC	330
F11u5	F11	A	T	I	F	cds	GE339	GCCACACACTTCACAATGTC	CAGGCCGTAAGTCTAGTAGTGTTAAA	GCCACACACTTCACAATGTCtgggaattattttagtaaaggaaatttctttccctctgttgtttgctccttagggtagagtcacctaagatttgcgtgtctacagtggcatttaaatcaatctgaaataaaagaggacacatctttctttggggttcaagaaataataatccatgatcagtataaaatggcagaaagcgggtatgat[a/t]ttgccttgttgaaactggaaaccacagtgaattacacaggtacggagaatttatccggaaagttgtctccaatggtgaactggataaaatgTTTAACACTACTAGACTTACGGCCTG	333
F11u6	F11	A	T	E	V	cds	GE324	CCTTTATGAGATTACCACCTAACTAGA	TTTAAAAATCTGTCTCCTCGATGT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgtactacatcacag[a/t]atgtgtgactcagttgttgaaggacacctgctttgaaggaggggacattactacggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtttactcttcactttcacggcggaatcaccatctgaggatcccacccgatggtaaatgcttatgtttctACATCGAGGAGACAGATTTTTAAA	286
F11u7	F11	C	T	D	D	cds	GE283	GTATTGTGTATGGTTATTCTACAAACG	AAAAACCCCAACGCATTAAG	GTATTGTGTATGGTTATTCTACAAACGaaccaaaaaaatttttttcagacaaaatacaaaatactctccagaaagccaagatacccttagtgaccaacgaagagtgccagaagagatacagaggacataaaataacccataagatgatctgtgccggctacagggaaggagggaagga[c/t]gcttgcaaggtaacagagtgttcttagccaatggaatatatgcaaattggaatgCTTAATGCGTTGGGTTTTT	257
F11u8	F11	G	A	E	E	cds	GE352	TGAGCAAGATGTGCTGAAGAT	AGCATGCTGGCACAGTGAA	TGAGCAAGATGTGCTGAAGATgggaagcgtctgagttgatctgtgcaccttttcttgtctcccctcgttctagggagattcgggaggccctctgtcctgcaaacacaatgaggtctggcatctggtaggcatcacgagctggggcgaaggctgtgctcaaagggagcggccaggtgtttacaccaacgtggtcga[g/a]tacgtggactggattctggagaaaactcaagcagtgtgaatgggttcccaggggccattggagtccctgaaggacccaggatttgctgggagagggtgttgagTTCACTGTGCCAGCATGCT	322
F11u9	F11	T	C	L	P	cds	GE324	CCTTTATGAGATTACCACCTAACTAGA	TTTAAAAATCTGTCTCCTCGATGT	CCTTTATGAGATTACCACCTAACTAGAtgtatgcccagtaaaatccaacataacgcatgccatgtactacatcacagaatgtgtgactcagttgttgaaggacacctgctttgaaggaggggacattactacggtcttcacaccaagcgccaagtactgccaggtagtctgcacttaccacccaagatgtttac[t/c]cttcactttcacggcggaatcaccatctgaggatcccacccgatggtaaatgcttatgtttctACATCGAGGAGACAGATTTTTAAA	286
F13A1d24	F13A1	C	T	-	-	noncoding	GE284	TGCCATGAATCTTGCAGTATC	CAACTTTTAGCTTACTCTTTCATGTG	TGCCATGAATCTTGCAGTATCtggacagaattggagatgacaaactcaca[c/t]tgcccttcctctgtgcaatgcaggcatgtatcggtgtggccccgcctcggttcaagccatcaagcacggccatgtctgcttccaatttgatgcaccttttgtttttgcagaggtaagcaggaagctggaggaaagtgctgtttttctccccaacctcttaaCACATGAAAGAGTAAGCTAAAAGTTG	242
F13A1d25	F13A1	T	C	-	-	noncoding	GE284	TGCCATGAATCTTGCAGTATC	CAACTTTTAGCTTACTCTTTCATGTG	TGCCATGAATCTTGCAGTATCtggacagaattggagatgacaaactcacac[t/c]gcccttcctctgtgcaatgcaggcatgtatcggtgtggccccgcctcggttcaagccatcaagcacggccatgtctgcttccaatttgatgcaccttttgtttttgcagaggtaagcaggaagctggaggaaagtgctgtttttctccccaacctcttaaCACATGAAAGAGTAAGCTAAAAGTTG	242

FIG. 5NN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13A1d 26	F13A1	C	T	-	-	noncoding	GE284	TGCCATGAATC TTGCAGTATC	CAACTTTTAGC TTACTCTTTCA TGTG	TGCCATGAATCTTGCAGTATCtggacagaattggagatgacaaactcacactgcccttcctctgt gcaatgcaggcatgtatcggtgtggccccgcctcggttcaagccatcaagcacggccatgtctgc ttccaatttgatgcaccttttgttttgcagaggtaagcaggaagctggaggaaagtgctgtttt t[c/t]tccccaacctcttaaCACATGAAAGAGTAAGCTAAAAGTTG	242
F13A1d 27	F13A1	A	G	-	-	noncoding	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctctcttaggtccgtggcactca ggtagttggttctgacatgactgtgacagttcagtttaccaatcctttaaaagaaaccctgcgaa atgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggtaaacc ttgggttggggagaccgggcaggcagtgcag[a/g]gctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1d 28	F13A1	C	G	-	-	noncoding	GE305	GAGCAGAACGA GGTTTTATTTG	GATCTATGTTT GGAAAAGACAC ACA	GAGCAGAACGAGGTTTTATTTG[c/g]tgctaatgacctgcattctctctcttaggtccgtggca ctcaggtagttggttctgacatgactgtgacagttcagtttaccaatcctttaaaagaaaccctg cgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggta aaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCT TTTCCAAACATAGATC	276
F13A1u 1	F13A1	A	C	P	P	cds	GE344	GCCCCTACAAG AAGGGTTTTT	AGAACAGAAAC ATCAGATTGAG TCTA	GCCCCTACAAGAAGGGTTTTTtcactctgtgtttattaaatgctggtgatgtgtttagctgtggt ctgtcctttcctgtagttttacgatgccttggaatacc[a/c]gcaagaattgttaccaattatt tctctgcccatgataatgatgccaatttgcaaatggacatcttcctggaagaagatgggaacgtg aattccaaactcaccaaggattcagtgtggtgagtttgattgacaatggcattggctgatgtcac attatagtaatgttacacatttaccacaagaTAGACTCAATCTGATGTTTCTGTTCT	317
F13A1u 10	F13A1	C	T	P	L	cds	GE487	ACACGGTGCAT CCATTA	CGAGTCTCACA AAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctct ggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaa aaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtgg aaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgt tacaccatcacagcttatctctcagccaacatcaccttctacaccggggtcc[c/t]gaaggcag aattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGG TTCTTTGTGAGACTCG	406
F13A1u 11	F13A1	T	A	L	Q	cds	GE314	GGGTAGGGAAA CTTGGAGAAAA	TTTGTCTCTGT TCCAGGATGA	GGGTAGGGAAACTTGGAGAAAAgtaaagcagaccctgtctcaagtcttgatgccaggcctgtgtg tgttttctcctactagtcaagaaagaggcggtgc[t/a]gatccaagccggcgagtacatgggtc agctgctggaacaagcgtccctgcacttctttgtcacagctcgcatcaatgagaccagggatgtt ctggccaagcaaaagtccaccgtgctaaccatccctgagatcatcatcaaggtcagtcttagcgt cTCATCCTGGAACAGAGACAAA	282
F13A1u 12	F13A1	T	A	I	N	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaa[t/a]ccggcccaactccaccgtgcag tgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtga ctccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274
F13A1u 13	F13A1	T	A	L	Q	cds	GE299	TCCGAACCTCT CCTCTCTTTT	CAAGAGCTATT TTTGCGTTAGA A	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtggg aagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactcc ctgagacatgtgtatggcgagc[t/a]ggacgtgcagattcaaagacgaccttccatgtgaatgc acaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGC AAAAATAGCTCTTG	274

FIG. 50O

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Alu 14	F13A1	G	T	M	I	cds	GE299	TCCGAACCTCTCCTCTCTTTT	CAAGAGCTATTTTTGCGTTAGAA	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccat[g/t]tgaatgcacaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGCAAAAATAGCTCTTG	274
F13Alu 15	F13A1	T	A	F	L	cds	GE251	TTTGGAAACAGTCTGGTTTGG	TGAAGTAAAAATGTCCTTGACAATA	TTTGGAAACAGTCTGGTTTGGtaatagtcactatgtttaaaccctgatgcagatgatgctgtgtatctggacaatgagaaagaaagagaagagtatgtcctgaatgacatcggggtaatttt[t/a]tatggagaggtcaatgacatcaagaccagaagctggagctatggtcaggtgagccacttaaaatttgtTATTGTCAAGGACATTTTTACTTCA	220
F13Alu 16	F13A1	C	T	T	I	cds	GE487	ACACGGTGCATCCATTA	CGAGTCTCACAAAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctctggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaaaaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgttacaccatca[c/t]agcttatctctcagccaacatcaccttctacaccggggtcccgaaggcagaattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGGTTCTTTGTGAGACTCG	406
F13Alu 17	F13A1	T	A	-	-	noncoding	GE305	GAGCAGAACGAGGTTTTATTTG	GATCTATGTTTGGAAAAGACACACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctc[t/a]cttaggtccgtggcactcaggtagttggttctgacatgactgtgacagttcagtttaccaatcctttaaaagaaaccctgcgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggtaaaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCTTTTCCAAACATAGATC	276
F13Alu 18	F13A1	G	T	V	L	cds	GE256	TTCTGAAGGACCTTGTAAAGTCAA	ACCCAGAGTGGTGGGGAAG	TTCTGAAGGACCTTGTAAAGTCAAaaatgtcagaaacttccaggaccgcctttggaggcagaagagcagttccacccaataactctaatgcagcggaagatgacctgcccacagtggagcttcagggc[g/t]tggtgccccggggcgtcaacctgcaaggtatgagcataccccccTTCCCCACCACTCTGGGT	195
F13Alu 19	F13A1	T	A	D	E	cds	GE344	GCCCCTACAAGAAGGGTTTTT	AGAACAGAAACATCAGATTGAGTCTA	GCCCCTACAAGAAGGGTTTTTcactctgtgtttattaaatgctggtgatgtgtttagctgtggtctgtcctttcctgtagttttacgatgccttggaataccagcaagaattgttaccaattatttctctgcccatgataatgatgccaatttgcaaatggacatcttcctggaagaagatgggaacgtgaattccaaactcaccaagga[t/a]tcagtgtggtgagtttgattgacaatggcattggctgatgtcacattatagtaatgttacacatttaccacaagaTAGACTCAATCTGATGTTTCTGTTCT	317
F13Alu 2	F13A1	C	T	S	S	cds	GE487	ACACGGTGCATCCATTA	CGAGTCTCACAAAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctctggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaaaaagcccctcaacacagaaggtgtcatgaaatcaaggtc[c/t]aacgttgacatggactttgaagtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgttacaccatcacagcttatctctcagccaacatcaccttctacaccggggtcccgaaggcagaattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGGTTCTTTGTGAGACTCG	406
F13Alu 20	F13A1	A	G	E	E	cds	GE487	ACACGGTGCATCCATTA	CGAGTCTCACAAAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctctggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaaaaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgttacaccatcacagcttatctctcagccaacatcaccttctacaccggggtcccgaaggcaga[a/g]ttcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGGTTCTTTGTGAGACTCG	406

FIG. 5PP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13A1u 21	F13A1	T	A	D	E	cds	GE289	TGATGGCTAATGCTCTCCTC	GAACTCATCTCTGAGTGACAATGAA	TGATGGCTAATGCTCTCCTCtcctgtttccaggtcaacagcgacctcatttacattacagctaagaaaga[t/a]ggcactcatgtggtggaaaatgtggatgccacccacattgggaaattaattgtgaccaaacaaattggaggagatggcatgatggatattactgatacttacaaattccaagaaggtaatttactaccactgaatgaagatttatttgcccaagtccattgagtacttaTTCATTGTCACTCAGAGATGAGTTC	269
F13A1u 22	F13A1	G	C	G	G	cds	GE487	ACACGGTGCATCCATTA	CGAGTCTCACAAAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctctggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaaaaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgttacaccatcacagcttatctctcagccaacatcaccttctacaccgg[g/c]gtcccgaaggcagaattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGGTTCTTTGTGAGACTCG	406
F13A1u 23	F13A1	G	A	V	I	cds	GE305	GAGCAGAACGAGGTTTTATTTG	GATCTATGTTTGGAAAAGACACACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctctcttaggtccgtggcactcaggtagttggttctgacatgactgtgaca[g/a]ttcagtttaccaatcctttaaaagaaaccctgcgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggtaaaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCTTTTCCAAACATAGATC	276
F13A1u 3	F13A1	T	A	A	A	cds	GE487	ACACGGTGCATCCATTA	CGAGTCTCACAAAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctctggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaaaaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgttacaccatcacagc[t/a]tatctctcagccaacatcaccttctacaccggggtcccgaaggcagaattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGGTTCTTTGTGAGACTCG	406
F13A1u 4	F13A1	C	G	Q	E	cds	GE305	GAGCAGAACGAGGTTTTATTTG	GATCTATGTTTGGAAAAGACACACA	GAGCAGAACGAGGTTTTATTTGctgctaatgacctgcattctctctcttaggtccgtggcactcaggtagttggttctgacatgactgtgacagtt[c/g]agtttaccaatcctttaaaagaaaccctgcgaaatgtctgggtacacctggatggtcctggagtaacaagaccaatgaagaagatgttccggtaaaccttgggttggggagaccgggcaggcagtgcagagctgtgggaagctttctctgTGTGTGTCTTTTCCAAACATAGATC	276
F13A1u 5	F13A1	T	A	S	T	cds	GE299	TCCGAACCTCTCCTCTCTTTT	CAAGAGCTATTTTTGCGTTAGAA	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaac[t/a]ccaccgtgcagtgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccatgtgaatgcacaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGCAAAAATAGCTCTTG	274
F13A1u 6	F13A1	C	A	A	A	cds	GE299	TCCGAACCTCTCCTCTCTTTT	CAAGAGCTATTTTTGCGTTAGAA	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagc[c/a]agcatgagcagtgactccctgagacatgtgtatggcgagctggacgtgcagattcaaagacgaccttccatgtgaatgcacaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGCAAAAATAGCTCTTG	274
F13A1u 7	F13A1	C	T	D	D	cds	GE299	TCCGAACCTCTCCTCTCTTTT	CAAGAGCTATTTTTGCGTTAGAA	TCCGAACCTCTCCTCTCTTTTccatcctttcagtgaaatccggcccaactccaccgtgcagtgggaagaagtgtgccggccctgggtctctgggcatcggaagctgatagccagcatgagcagtgactccctgagacatgtgtatggcgagctgga[c/t]gtgcagattcaaagacgaccttccatgtgaatgcacaggaagctgagatgaaccctggcatttggcctcttgtagtcttggctaaggaaaTTCTAACGCAAAAATAGCTCTTG	274

FIG. 5QQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Alu8	F13A1	T	C	D	D	cds	GE344	GCCCCTACAAGAAGGGTTTTT	AGAACAGAAACATCAGATTGAGTCTA	GCCCCTACAAGAAGGGTTTTTtcactctgtgtttattaaatgctggtgatgtgtttagctgtggtctgtcctttcctgtagttttacgatgccttggaataccagcaagaattgttaccaattatttctctgcccatga[t/c]aatgatgccaatttgcaaatggacatcttcctggaagaagatgggaacgtgaattccaaactcaccaaggattcagtgtggtgagtttgattgacaatggcattggctgatgtcacattatagtaatgttacacatttaccacaagaTAGACTCAATCTGATGTTTCTGTTCT	317
F13Alu9	F13A1	C	A	P	T	cds	GE487	ACACGGTGCATCCATTA	CGAGTCTCACAAAGAACCA	ACACGGTGCATCCATTAatgtgactttctctctggtggattgtattttgcctgtcattatctctggatctcccccaggtcaagaagaagagagattggccctagaaactgccctgatgtacggagctaaaaagcccctcaacacagaaggtgtcatgaaatcaaggtccaacgttgacatggactttgaagtggaaaatgctgtgctgggaaaagacttcaagctctccatcaccttccggaacaacagccacaaccgttacaccatcacagcttatctctcagccaacatcaccttctacaccggggtc[c/a]cgaaggcagaattcaagaaggagacgttcgacgtgacgctggagcccttgtcctgtaagctaacaatggtgTGGTTCTTTGTGAGACTCG	406
F13Bd20	F13B	T	G	-	-	noncoding	GE264	AAAATTGAAAGGCTGAGATTGTAA	CAAATATTTAAGCAAGGAAAAACTCC	AAAATTGAAAGGCTGAGATTGTAA[t/g]taacacctgactgcaattgatgcttatttcaaaatctctctttttcccctcaagcactctgtcttatcaagaacccttaagaacatagaaatgaatggcagaaagaggagtcatatttcaatacatcatgaattccttataaaatataatttgaggaaataagttaaaaacttcGGAGTTTTTCCTTGCTTAAATATTTG	232
F13Bd21	F13B	A	T	E	V	cds	GE370	CTTGAAGAAGCTTTGCTAAAATG	GCCTAAGCAGTGGTCTTTTCCTA	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactgtacctttttcagaaggacaggagaaggtagcctgtgaggaaccacccttcattgaaaatggtgcagcaaatttacactctaagatttattacaatggggataaagtgacatatgcatgtaaaagcggctaccttctccatggatcgaatgagataacttgtaatcgtggaaaatggacacttcctcctg[a/t]gtgtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaattttccattctgttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bd22	F13B	A	G	Q	Q	cds	GE373	CCAAAATGAAATCGCCAATAATA	TTCCTGCATTGTAGACATAATGA	CCAAAATGAAATCGCCAATAATAacattatacttttggcttaatttacaatttagtaaaagacaagcttagtttcatcattaagttaaataatttttttcccatagaaaaatgcactaagcctgacctgagtaatggttacatctctgatgtaaagttattgtataaaattca[a/g]gagaacatgcattatggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctgatggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaagataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctattatttaatagaatttattttTCATTATGTCTACAATGCAGGAA	423
F13Bd23	F13B	T	C	-	-	noncoding	GE373	CCAAAATGAAATCGCCAATAATA	TTCCTGCATTGTAGACATAATGA	CCAAAATGAAATCGCCAATAATAacatta[t/c]acttttggcttaatttacaatttagtaaaagacaagcttagtttcatcattaagttaaataatttttttcccatagaaaaatgcactaagcctgacctgagtaatggttacatctctgatgtaaagttattgtataaaattcaagagaacatgcattatggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctgatggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaagataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctattatttaatagaatttattttTCATTATGTCTACAATGCAGGAA	423
F13Bd24	F13B	T	A	-	-	noncoding	GE373	CCAAAATGAAATCGCCAATAATA	TTCCTGCATTGTAGACATAATGA	CCAAAATGAAATCGCCAATAATAacattatacttttggcttaatttacaatttagtaaaagacaagcttagtttcatcattaagttaaataatttttttcccatagaaaaatgcactaagcctgacctgagtaatggttacatctctgatgtaaagttattgtataaaattcaagagaacatgcattatggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctgatggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaagataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctatta[t/a]ttaatagaatttattttTCATTATGTCTACAATGCAGGAA	423

FIG. 5RR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bd25	F13B	C	T	C	C	cds	GE385	CACCTTTTCATGCATTTTTGC	TGACCACAGGAATTTTGTCAGA	CACCTTTTCATGCATTTTTGCctttattttaattatgttgatagcagtctttgataattaaagc tctcaagtagaataaattcatttagctcacagaattaaattagaataagcctaatgatatttaa caaatatataaaatgaattcataagcttttggcaaatttaatttctattctagttatgtcatgt aaatagtgcattttgttgtagcagaaaaaataaacatttgtttgtaattttattcattcttttat ttgcagaattaaagtgctcttctttaagattaattgaaaatggttattttcatcctgtaaagcaa acctatgaagaaggagatgtcgttcagttttctgtcatgaaaattattatctaagtggatctga tttaattcaatg[c/t]tataactttggttggtacccagaatctcctgtatgcgaaggtaaattt ttaaatttaatactcgcaaaatgccatgtctttatcagctttaatctctattagcTCTGACAAAA TTCCTGTGGTCA	532
F13Bd26	F13B	T	C	-	-	noncoding	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaggactccttgagttgtcacaaaa gtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaactttagttt gtattgtcacctgattacaaatttatgttttagatttgtttt[t/c]ccatattcagcttgaca tttactcatttcagagaaccctgtggtttcctcatgtggaaaatggaagaattgcccaatatt actatactttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttg gctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtc tccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaa atttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bd27	F13B	T	A	-	-	noncoding	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaggactccttgagttgtcacaaaa gtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaactttagttt gtattgtcacctgattacaaatttatgttttagatttgtttttccatattcagcttgacattta ctcatttcagagaaccctgtggtttcctcatgtggaaaatggaagaattgcccaatattacta tactttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttggctg gttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtctcca gagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaaattt gtatat[t/a]AAAATAGGGGTCCAATAAAAATG	489
F13Bd28	F13B	C	G	-	-	noncoding	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaggact[c/g]cttgagttgtcac aaaagtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaactttta gtttgtattgtcacctgattacaaatttatgttttagatttgtttttccatattcagcttgaca tttactcatttcagagaaccctgtggtttcctcatgtggaaaatggaagaattgcccaatatt actatactttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttg gctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtc tccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaa atttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bd29	F13B	G	A	T	T	cds	GE481	CAATTTTGCCAAGAGTTGATT	TTCTCTATGAGAAAAAGCTTTCAG	CAATTTTGCCAAGAGTTGATTttaccatgtattcttaagatttgtaaaaccatattttgagattt tttataatctaggttattaaaaagtttataaaataaataattttataattttagaaac[g/a]t gtttggctcctgaattatataatggaaattattccacaacacagaaaacattcaaagtgaaggac aaagtacaatacgaatgtgctactggctactacacagctggaggaaagaagacagaggaggtaga atgtctcacatacggatggtctctcacaccaaaatgtaccagtaggttctcatttggaataaaat ctactctcactCTGAAAGCTTTTTCTCATAGAGAA	360
F13Bd30	F13B	A	G	-	-	noncoding	GE481	CAATTTTGCCAAGAGTTGATT	TTCTCTATGAGAAAAAGCTTTCAG	CAATTTTGCCAAGAGTTGATTttaccatgtattcttaagatttgt[a/g]aaaccatattttgag atttttataatctaggttattaaaaagtttataaaataaataattttataattttagaaacgt gtttggctcctgaattatataatggaaattattccacaacacagaaaacattcaaagtgaaggac aaagtacaatacgaatgtgctactggctactacacagctggaggaaagaagacagaggaggtaga atgtctcacatacggatggtctctcacaccaaaatgtaccagtaggttctcatttggaataaaat ctactctcactCTGAAAGCTTTTTCTCATAGAGAA	360

FIG. 5SS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bu1	F13B	A	T	-	-	noncoding	GE358	GATGCTTGACA CGATGAATATT TTA	GTACAGTTGAA AGAGAACTGAC CA	GATGCTTGACACGATGAATATTTTAatttaatctttattatttttgtaattatatgactaaagg tgctgatta[a/t]ttttttccataaggaagaagaaacagatgtcctcctccacctctgcccata aactccaaaattcaaacacattcaacaacttatcgtcatggagaaatagttcatatagaatgtga acttaattttgagatccatgggtcagcagaaatacgttgtgaagatggaaaatcgacagaacctc caaaatgcattggttagtaacaccttgaagaagctttgctaaaatgaaatctgcatgtgtagcta aaTGGTCAGTTCTCTTTCAACTGTAC	351
F13Bu10	F13B	C	T	N	N	cds	GE365	CAACACAACGA TTCCTGTTCTT	GAGTGGTATAG AACATAACATT TCTGA	CAACACAACGATTCCTGTTCTTaccaagatgtaacaagatagtttcttctttttctttcttttt ttttaaattgttgttcccagagccatgcacattatcttttactgaaatggaaaagaataatttac ttctgaaatgggattttgacaa[c/t]agaccacacattttgcatggtgaatatattgagtttat ttgtagaggagatacttatccagctgaattatatattactggatctatacttagaatgcaatgtg acagagggcagttaaaatatccaagatgtattccaagacaaaggtaagaagtttttttttttgg tcagattatttttttggtcagattgttattcaacattTCAGAAATGTTATGTTCTATACCACTC	390
F13Bu11	F13B	T	C	G	G	cds	GE396	TGTTGGATGTT TAAAGTCATTT GC	CATTTTTATTG GACCCCTATTT T	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaaggactccttgagttgtcacaaaa gtaccttaaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaaacttttagttt gtattgtcacctgattacaaatttatgttttagatttgtttttccatattcagcttgacattta ctcatttcagagaaaccctgtggtttttcctcatgtggaaaatggaagaattgcccaatattacta tactttaaaagcttttactttccaatgagcatagacaaaaaattgtcatttttctgcttggctg g[t/c]tataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtc tccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaa atttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bu12	F13B	A	G	H	R	cds	GE370	CTTGAAGAAGC TTTGCTAAAAT G	GCCTAAGCAGT GGTCTTTTCCT A	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactg taccttttcagaaggacaggagaaggtagcctgtgaggaaccacccttcattgaaaatggtgcag caaatttac[a/g]ctctaagatttattacaatggggataaagtgacatatgcatgtaaaagcgg ctaccttctccatggatcgaatgagataacttgtaatcgtggaaaatggacacttcctcctgagt gtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaatttccattctg ttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bu13	F13B	A	T	-	-	noncoding	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaacttattttgc[a/t]gaatctaaaggaatgtgcacatctcctcctcttattaaacatg gagtcattattagttcaacagtagacacctatgaaaatggctcttcagtagaatacagatgtttt gatcaccatttcctagaaggatctagggaggcctattgtttagatggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatattttaatttg ctgtcattttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383
F13Bu14	F13B	T	G	D	E	cds	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaacttattttgcagaatctaaaggaatgtgcacatctcctcctcttattaaacatggagt cattattagttcaacagtagacacctatgaaaatggctcttcagtagaatacagatgttttgatc accatttcctagaaggatctagggaggcctattgtttaga[t/g]ggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatattttaatttg ctgtcattttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383
F13Bu15	F13B	A	C	Y	S	cds	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaacttattttgcagaatctaaaggaatgtgcacatctcctcctcttattaaacatggagt cattattagttcaacagtagacacct[a/c]tgaaaatggctcttcagtagaatacagatgtttt gatcaccatttcctagaaggatctagggaggcctattgtttagatggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatattttaatttg ctgtcattttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383

FIG. 5TT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bu16	F13B	T	C	P	P	cds	GE370	CTTGAAGAAGCTTTGCTAAAATG	GCCTAAGCAGTGGTCTTTTCCTA	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactgtaccttttcagaaggacaggagaaggtagcctgtgaggaaccacccttcattgaaaatggtgcagcaaatttacactctaagatttattacaatggggataaagtgacatatgcatgtaaaagcggctaccttctccatggatcgaatgagataacttgtaatcgtggaaaatggacacttcc[t/c]cctgagtgtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaaattttccattctgttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bu17	F13B	T	A	N	K	cds	GE400	TTTGCTGTCAACTCTTGCTTAG	AAATGAGAGAGAAAACACTTGTGAAA	TTTGCTGTCAACTCTTGCTTAGcaaatttaaaaatatttgagctgaaaaaatttttcatatttgtaatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgagttactatagtatattgttatgagctcatattaatttaaaacaacctcttttcttagaaaa[t/a]aatgagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacgggatattggcaagctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaaatatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacacatggaatgtctacgtttgtactttatgtgatttcttacagtgttttatatcatgaaaatgatgattttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu18	F13B	G	C	L	L	cds	GE264	AAAATTGAAAGGCTGAGATTGTAA	CAAATATTTAAGCAAGGAAAAACTCC	AAAATTGAAAGGCTGAGATTGTAAttaacacctgactgcaattgatgcttatttcaaaatctctctttttcccctcaagcactct[g/c]tcttatcaagaacccttaagaacatagaaatgaatggcagaaagaggagtcatatttcaatacatcatgaaattccttataaatataattttgaggaaataagttaaaaacttcGGAGTTTTTCCTTGCTTAAATATTTG	232
F13Bu19	F13B	T	A	N	K	cds	GE400	TTTGCTGTCAACTCTTGCTTAG	AAATGAGAGAGAAAACACTTGTGAAA	TTTGCTGTCAACTCTTGCTTAGcaaatttaaaaatatttgagctgaaaaaatttttcatatttgtaatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgagttactatagtatattgttatgagctcatattaatttaaaacaacctcttttcttagaaaataa[t/a]gagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacgggatattggcaagctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaaatatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacacatggaatgtctacgtttgtactttatgtgatttcttacagtgttttatatcatgaaaatgatgattttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu2	F13B	A	G	M	V	cds	GE396	TGTTGGATGTTTAAAGTCATTTGC	CATTTTTATTGGACCCCTATTTT	TGTTGGATGTTTAAAGTCATTTGCagatcaattatgataaaggactccttgagttgtcacaaaagtaccttaaaatttaagtaagaaaaataagtactagttgaagtgtctctaaaactttagtttgtattgtcacctgattacaaatttatgttttagatttgtttttccatattcagcttgacattactcatttcagagaaaccctgtggtttcctcatgtggaaaatggaagaattgcccaatattactatacttttaaaagctttactttcca[a/g]tgagcatagacaaaaattgtcatttttctgcttggctggttataccactgaaagtggaagacaagaagagcaaaccacgtgtacaacagaaggctggtctccagagccaaggtgcttcagtaagtcagctggatatgtcactcaatgtttcaatactcaaagaaatttgtatataAAAATAGGGGTCCAATAAAAATG	489
F13Bu3	F13B	A	G	H	R	cds	GE373	CCAAAATGAAATCGCCAATAATA	TTCCTGCATTGTAGACATAATGA	CCAAAATGAAATCGCCAATAATAacattatactttggcttaattttacaatttagtaaaagacaagcttagtttcatcattaagttaaataatttttttcccatagaaaaatgcactaagcctgacctgagtaatggttacatctctgatgtaaagttattgtataaaattcaagagaacatgc[a/g]ttatggttgcgcttcagggtacaaaaccactggagggaaggatgaagaagtggttcaatgtctctctgatggatggtcttctcaaccaacctgtaggaaagaacatggtataagaatcatttcctaaanctgaagataagtgcttatcaagcttatattgaatatattgaagcttatattgatatctattatttaatagaatttattttTCATTATGTCTACAATGCAGGAA	423

FIG. 5UU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F13Bu4	F13B	A	T	N	Y	cds	GE358	GATGCTTGACA CGATGAATATT TTA	GTACAGTTGAA AGAGAACTGAC CA	GATGCTTGACACGATGAATATTTTAatttaatctttattatttttgtaattatatgactaaagg tgctgattaatttttccataaggaagaagaaacagatgtcctcctccacctctgcccataaact ccaaaattcaaacacattcaacaacttatcgtcatggagaaatagttcatatagaatgtgaactt [a/t]attttgagatccatgggtcagcagaaatacgttgtgaagatggaaaatcgacagaacctc caaaatgcattggttagtaacaccttgaagaagctttgctaaaatgaaatctgcatgtgtagcta aaTGGTCAGTTCTCTTTCAACTGTAC	351
F13Bu5	F13B	C	T	P	S	cds	GE370	CTTGAAGAAGC TTTGCTAAAAT G	GCCTAAGCAGT GGTCTTTTCCT A	CTTGAAGAAGCTTTGCTAAAATGaaatctgcatgtgtagctaaatggtcagttctctttcaactg taccttttcagaaggacaggagaaggtagcctgtgaggaaccacccttcattgaaaatggtgcag caaatttacactctaagatttattacaatggggataaagtgacatatgcatgtaaaagcggctac cttctccatggatcgaatgagataacttgtaatcgtggaaaatggacactt[c/t]ctcctgagt gtgttggtatgtatgctacatttaccatcagtagctaaacttatggtgtaaatttccattctg ttactttaatctgaatattccTAGGAAAAGACCACTGCTTAGGC	369
F13Bu6	F13B	T	A	M	K	cds	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaatttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaattttaaaacaacctcttttcttagaaaataat gagaattgtaagcatcctcctgttgtaa[t/a]gaatggggctgttgcagacgggatattggcaa gctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaa atatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacac atggaatgtctacgtttgtacttttatgtgatttcttacagtgttttatatcatgaaaatgatg atttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu7	F13B	T	A	I	K	cds	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaatttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaattttaaaacaacctcttttcttagaaaataat gagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacggga[t/a]attggcaa gctatgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaa atatctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaagagaacac atggaatgtctacgtttgtacttttatgtgatttcttacagtgttttatatcatgaaaatgatg atttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu8	F13B	G	A	-	-	noncoding	GE400	TTTGCTGTCAA CTCTTGCTTAG	AAATGAGAGAG AAAACACTTGT GAAA	TTTGCTGTCAACTCTTGCTTAGcaaatttaaaaatatttgagctgaaaaaatttttcatatttg taatgaatttataaaacaattgtcctaaattatataatacaaatatcgagacactatagtatgag ttactatagtatattgttatgagctcatattaattttaaaacaacctcttttcttagaaaataat gagaattgtaagcatcctcctgttgtaatgaatggggctgttgcagacgggatattggcaagcta tgcaacaggatcctcagtggaatatagatgcaatgaatattacttactgaggggatcaaaaatat ctcgttgcgaacaaggaaaatggtcatccccacctgtttgcttgggtaagaaa[g/a]agaacac atggaatgtctacgtttgtacttttatgtgatttcttacagtgttttatatcatgaaaatgatg atttgtacaaatctttTTTCACAAGTGTTTTCTCTCTCATTT	498
F13Bu9	F13B	T	A	-	-	noncoding	GE380	GGAGACTCTGT CTCTGTAGCAC TTAT	AACACAAATGT AGCAAATATAG CATT	GGAGACTCTGTCTCTGTAGCACTTATaaagtactggatgttcattatagcaattcattgtatact ttaaaact[t/a]attttgcagaatctaaaggaatgtgcacatctcctcctcttattaaacatg gagtcattattagttcaacagtagacacctatgaaaatggctcttcagtagaatacagatgtttt gatcaccatttcctagaaggatctagggaggcctattgtttagatggaatgtggactacaccacc attgtgtttaggtatgtactactaaatatgcctctaacaaagtaaaactatatattttaatttg ctgtcattttgagttaacataacactaatatAATGCTATATTTGCTACATTTGTGTT	383

FIG. 5VV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5d47	F5	G	A	-	-	noncoding	GE949	TCCCTAACCATGGAGTTTTACTTT	GCACAACTGTAGGGGGTA	TCCCTAACCATGGAGTTTTACTTTatt[g/a]tatatattttctaagcaaaaattattcattttttttctgtttttcatagactgtaggatgccaatgggactaagcactggtatcatatctgattcacagatcaaggcttcagagtttctgggtaagttgtagcacatggtctgtgaatggTACCCCCTACAGTTGTGC	200
F5d48	F5	A	G	-	-	noncoding	GE316	GCAAAGGTTTTAACATCTTCCTT	GCACAGTCTTCAGATTGCTTT	GCAAAGGTTTTAACATCTTCCTTatctatgtgtttttgtcatttttc[a/g]taggcaaacaacaataagcagtggctagaaattgatctactcaagatcaagaagataacggcaattataacacagggctgcaagtctctgtcctctgaaatgtatgtaaagagctataccatccactacagtgagcagggagtggaatggaaaccatacaggctgaaatcctccatggtggacaaggtagagtggcatctgggcaaagagAAAGCAATCTGAAGACTGTGC	282
F5d49	F5	C	G	H	Q	cds	GE387	GTGCCCCCAGAGGAACACTA	TCATATGGCTGAGTTCTGGAG	GTGCCCCCAGAGGAACACTAtcaaacattccccattcaagaccctgatcaaatgcactctacttcagaccccagtca[c/g]agatcctcttctccagagctcagtgaaatgcttgagtatgaccgaagtcacaagtccttccccacagatataagtcaaatgtccccttcctcagaacatgaagtctggcagacagtcatctctccagacctcagccaggtgaccctctctccagaactcagccagacaaacctctctccagacctcagccacacgactctctctccagaactcattcagagaaacctttccccagccctcggtcagatgcccatttctccagacctcagccatacaaccctttctccagacctcagccatacaacccttctttagacctcagccagacaaacctctctccagaactcagtcagacaaacctttctccagccctcggtcagatgccccttttctccagacctcagccatacaaccctttctctagacttcagccagacaaacctctCTCCAGAACTCAGCCATATGA	548
F5d50	F5	A	G	T	T	cds	GE389	GAAAGGTAGCTATGAAATAATCCAAGA	GGGTCTTGAATGGGGAATGT	GAAAGGTAGCTATGAAATAATCCAAGAtactgatgaagacacagctgttaacaattggctgatcagcccccagaatgcctcacgtgcttggggagaaagcacccctcttgccaacaagcctggaaagcagagtggccacccaaagtttcctagagttagacataaatctctacaagtaagacaggatggaggaaagagtagactgaagaaaagccagtttctcattaagacacgaaaaaagaaaaaagagaagcacacacaccatgctcctttatctccgaggacctttcaccctctaagaagtgaagcctacaacacatttcagaaagaagacttaagcattcgttggtgcttcataaatccaatgaaacatctcttcccacagacctcaatcagac[a/g]ttgccctctatggatttggctggatagcctcacttcctgaccataatcagaattcctcaaatgacactggtcaggcaagctgtcctccaggtctttatcayacagtgcccccagaggaacactatcaaACATTCCCCATTCAAGACCC	553
F5d51	F5	A	C	E	A	cds	GE496	CTTTCTCCAGACCTTGGTGAG	AAGGAGAAAACTGGCCAAAC	CTTTCTCCAGACCTTGGTGAGacagatctttccccaaactttggtcagatgtccctttccccagacctcagccaggtgactctctctccagacatcagtgacaccacccttctcccggatctcagccagatatcacctcctccagaccttgatcagatattctacccttctgaatctagtcagtcattgcttcttcaagaatttaatgagtcttttccttatccagaccttggtcagatgccatctccttcatctcctactctcaatgatacttttctatcaaaggaatttaatccactggttatagtgggcctcagtaaagatggtacagattacattgagatcattccaaaggaag[a/c]ggtccagagcagtgaagatgactatgctgaaattgattatgtgccctatgatgacccctacaaaactgatgttaggacaaacatcaactcctccagagatcctgacaacattgcagcatggtacctccgcagcaacaatggaaacagaagaaattattacattgctgctgaagaaatatcctgggattattcagaatttgtacaaagGTTTGGCCAGTTTTCTCCTT	590

FIG. 5WW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5d52	F5	C	A	-	-	noncoding	GE910	GCAGGGAATATTGGTGTG	TTTACTGATACAATGGCAGAGTT	GCAGGGAATATTGGTGTGtaattaatca[c/a]ggaaaccaccacatgacaggatgttccacacccctgggtatggaaaatggaaagatagaaaacaagcaaatcacagcttcttcgtttaagaaatcttggtggggagattactgggaacccttccgtgcccgtctgaatgcccagggacgtgtgaatgcctggcaagccaaggtcaagtatactctatgcatggtgttctcttagggctccaaaaaaaagcaaaggccctcactaccacaaacatggaggatctgggaagcaggagtattttaatctgtttctgcaaattaaaatcctaggtccaanagtccaggatgtctgtggacttgatanctttgactataactttgtctcaaaaanaagtcatttatcatctctgtggttttggtctattcttgatttaaaccaataataagcaaattaatttttctgcaaagggatanatggtaaatatttagtctttgtgggccatacattctctgccataactactcAACTCTGCCATTGTATCAGTAAA	552
F5d53	F5	C	T	-	-	noncoding	GE915	TGATTATCAGAAGAGCAAGGAAA	ACTGTGACCCAGTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccaggaaaaagatattcactcaggcttgataggtcccctcctaatctgccaaaaaggaata-tacataaggacagcaacatgcctatggacatgagagaatttgtcttactatttatgacctttgatgaaaagaagagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaaaatcccatgagtttcacggtattttcct[c/t]ggactttgatctaatctcctaatTAAATCACACTGGGTCACAGT	334
F5d54	F5	A	G	-	-	noncoding	GE915	TGATTATCAGAAGAGCAAGGAAA	ACTGTGACCCAGTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccaggaaaaagatattcactcaggcttgataggtcccctcctaatctgccaaaaaggaata-tacataaggacagcaacatgcctatggacatgagagaatttgtcttactatttatgacctttgatgaaaagaagagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaaaatcccatgagtttcacggtattttcctc[a/g]gactttgatctaatctcctaatTAAATCACACTGGGTCACAGT	334
F5d55	F5	A	G	G	G	cds	GE923	GATCATTCCTTTTCCTAGGTT	TTCAGATTACGAGGTTAGGGGA	GATCATTCCTTTTCCTAGGTTcgttttaaaaatttagcatccagaccgtattctctacatgcccatgg[a/g]ctttcctatgaaaaatcatcagagggaaagacttatgaagatgactctcctgaatggtttaaggaagataatgctgttcagccaaatagcagttatacctacgtatggcatgccactgagcgatcagggccagaaagtcctggctctgcctgtcgggcttgggcctactactcagctgtgaacccagtaggtactttcattgaaagtttttctcatTCCCCTAACCTCGTAATCTGAA	311
F5d56	F5	C	G	T	S	cds	GE923	GATCATTCCTTTTCCTAGGTT	TTCAGATTACGAGGTTAGGGGA	GATCATTCCTTTTCCTAGGTTcgttttaaaaatttagcatccagaccgtattctctacatgcccatggactttcctatgaaaaatcatcagagggaaaga[c/g]ttatgaagatgactctcctgaatggtttaaggaagataatgctgttcagccaaatagcagttatacctacgtatggcatgccactgagcgatcagggccagaaagtcctggctctgcctgtcgggcttgggcctactactcagctgtgaacccagtaggtactttcattgaaagtttttctcatTCCCCTAACCTCGTAATCTGAA	311
F5d57	F5	G	A	-	-	noncoding	GE924	TTGCTTGCCCTAAACTCTTTG	GAAAACAGGACCGAAAAATTACTA	TTGCTTGCCCTAAACTCTTTGntatccaggaaagntaatgagn[g/a]tnttttatctgcagtgctactgaaaacaagtctttcctttcatagggaccctaactgagggtgggacacagaagacgtttgacaagcaaatcgtgctactatttgctgtgtttgatgaaagcaagagctggagccagtcatcatccctaatgtacacagtcaatggatatgtgaatgggacaatgccaggtaacacgagggctgtgtaccattaaacaacagtaaaatcatTAGTAATTTTTCGGTCCTGTTTTC	303
F5u1	F5	C	T	N	N	cds	GE173	AAATTTGATTTAACTTTGTAGATCGTG	GGATTCAGTAGAAGTGAAAGATTCAA	AAATTTGATTTAACTTTGTAGATCGTGttcaaaaatatggccagccgcccctatagcatttaccctcatggagtgaccttctcgccttatgaagatgaagtcaa[c/t]tcttctttcacctcaggtTTGAATCTTTCACTTCTACTGAATCC	153

FIG. 5XX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u10	F5	T	C	I	I	cds	GE494	TCTGTCTCTCTTCTGTAGGAACT	CCCTGTGACATCTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaat[t/c]aggtc attccgaaactcatcattgaaccaggaagaagaagagttcaatcttactgccctagctctggaga atggcactgaattcgtttcttcgaacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u11	F5	C	T	N	N	cds	GE494	TCTGTCTCTCTTCTGTAGGAACT	CCCTGTGACATCTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaattaggtcattc cgaaactcatcattgaa[c/t]caggaagaagaagagttcaatcttactgccctagctctggaga atggcactgaattcgtttcttcgaacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u12	F5	A	C	N	T	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaaga[a/c] ctcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatc ctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaa gaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagatttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u13	F5	G	A	R	K	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattca[g/a]aagtcaa gaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagatttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u14	F5	C	T	T	T	cds	GE387	GTGCCCCCAGAGGAACACTA	TCATATGGCTGAGTTCTGGAG	GTGCCCCCAGAGGAACACTAtcaaacattccccattcaagaccctgatcaaatgcactctacttc agaccccagtcacagatcctcttctccagagctcagtgaaatgcttgagtatgaccgaagtcaca agtccttccccacagatataagtcaaatgtccccttcctcagaacatgaagtctggcagacagtc atctctccagacctcagccaggtgac[c/t]ctctctccagaactcagccagacaaacctctctc cagacctcagccacacgactctctctccagaactcattcagagaaacctttccccagccctcggt cagatgcccatttctccagacctcagccatacaacccttttctccagacctcagccatacaaccct ttctttagacctcagccagacaaacctctctccagaactcagtcagacaaacctttctccagccc tcggtcagatgccccctttctccagacctcagccatacaacccttttctctagacttcagccagaca aacctctCTCCAGAACTCAGCCATATGA	548

FIG. 5YY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u15	F5	T	G	S	A	cds	GE395	GACCTCAGCCA GACAAACCT	TCTGATCAAGG TCTGGAGGA	GACCTCAGCCAGACAAACCTctctccagaactcagtcagacaaacctttctccagccctcggtca gatgcccctttctccagacctcagccatacaaccctttctctagacttcagccagacaaacctct ctccagaactcagccatatgactctctctccagaactcagtcagacaaacctttccccagccctc ggtcagatgcccatttctccagacctcagccatacaaccctttctctagacttcagccagacaaa cctctctccagaactcagtcaaacaaacctttccccagccctcggtcagatgcccctttctccag accccagccatacaaccctttctctagacctcagccagacaaacctctctccagaactcagtcag acaaacctttccccagacctcagtgagatgcccctctttgcagatctcagtcaaattccccttac cccagacctcgaccagatgacactttctccagaccttggtgagacagatctt[t/g]ccccaaac tttggtcagatgtccctttccccagacctcagccaggtgactctctctccagacatcagtgacac caccccttctcccggatctcagccagatatcaccTCCTCCAGACCTTGATCAGA	638
F5u16	F5	C	A	S	S	cds	GE496	CTTTCTCCAGA CCTTGGTGAG	AAGGAGAAAAC TGGCCAAAC	CTTTCTCCAGACCTTGGTGAGacagatctttccccaaactttggtcagatgtccctttccccaga cctcagccaggtgactctctctccagacatcagtgacaccaccccttctcccggatctcagccaga tatcacctcctccagaccttgatcagatattctacccttctgaatctagtcagtcattgcttctt caagaatttaatgagtctttccttatccagaccttggtcagatgccatctccttcatctcctac tctcaatgatacttttctatcaaaggaatttaatccactggttatagtgggcctcagtaaagatg gtacagattacattgagatcattccaaaggaagaggtccagagcagtgaagatgactatgctgaa attgattatgtgccctatgatgacccctacaaaactgatgttaggacaaacatcaactc[c/a]t ccagagatcctgacaacattgcagcatggtacctccgcagcaacaatggaaacagaagaaattat tacattgctgctgaagaaatatcctgggattattcagaatttgtacaaagGTTTGGCCAGTTTTC TCCTT	590
F5u17	F5	A	T	N	I	cds	GE316	GCAAAGGTTTT AACATCTTCCT T	GCACAGTCTTC AGATTGCTTT	GCAAAGGTTTTAACATCTTCCTTatctatgtgttttgtcattttcataggcaaaca[a/t]caa taagcagtggctagaaattgatctactcaagatcaagaagataacggcaattataacacagggct gcaagtctctgtcctctgaaatgtatgtaaagagctataccatccactacagtgagcagggagtg gaatggaaaccatacaggctgaaatcctccatggtggacaaggtagagtggcatctgggcaaaga gAAAGCAATCTGAAGACTGTGC	282
F5u18	F5	G	C	D	H	cds	GE267	TGATGACCCTG AATACAGACAT AGT	AGTTTTAAATG TTGATGCTGGT ATT	TGATGACCCTGAATACAGACATAGTttaaatatttgttttcacaggacttcttgggcctacttta tatgctgaagtcggagacatcataaaagttcactttaaaaataaggca[g/c]ataagcccttga gcatccatcctcaaggaattaggtacagtaaattatcagaaggtaagataaatctaatattttc tgaaaagggaaaatgtctaagtctttAATACCAGCATCAACATTTAAAACT	246
F5u19	F5	G	A	K	K	cds	GE267	TGATGACCCTG AATACAGACAT AGT	AGTTTTAAATG TTGATGCTGGT ATT	TGATGACCCTGAATACAGACATAGTttaaatatttgttttcacaggacttcttgggcctacttta tatgctgaagtcggagacatcataaaagttcactttaaaaataaggcagataa[g/a]cccttga gcatccatcctcaaggaattaggtacagtaaattatcagaaggtaagataaatctaatattttc tgaaaagggaaaatgtctaagtctttAATACCAGCATCAACATTTAAAACT	246
F5u2	F5	G	A	R	K	cds	GE47	GAAATAACTTT GCAAATGAAAA CA	TTTCTGAAAGG TTACTTCAAGG AC	GAAATAACTTTGCAAATGAAAACAatttgaatatatttctttcaggcaggaacaacaccatga tcagagcagttcaaccaggggaaacctatacttataagtggaacatcttagagtttgatgaaccc acagaaaatgatgcccagtgcttaacaagaccatactacagtgacgtggacatcatga[g/a]ag acatcgcctctgggctaataggactacttctaatctgtaagagcagatccctggacaggcgagga atacaggtattttGTCCTTGAAGTAACCTTTCAGAAA	297

FIG. 5ZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u20	F5	G	A	S	S	cds	GE494	TCTGTCTCTCTTCTGTAGGAACT	CCCTGTGACATCTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaag ctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagatttt tgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatg aagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaattaggtcattc cgaaactcatcattgaaccaggaagaagaagagttcaatcttactgccctagctctggagaatgg cactgaattcgtttcttc[g/a]aacacagatataattgttggttcaaattattcttccccaagt aatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagc caccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacag cagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u21	F5	G	A	R	H	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaac atgctaagc[g/a]taagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctg gatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaa tgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagatttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u22	F5	A	G	R	G	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactca gttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctct acagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaac atgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatg aaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgag gccctgggaggaccttcctagccaagacactggttctccttcc[a/g]gaatgaggccctgggag gaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagatttggttgggagatg gcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgtta acaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u23	F5	T	A	L	Q	cds	GE316	GCAAAGGTTTTAACATCTTCCTT	GCACAGTCTTCAGATTGCTTT	GCAAAGGTTTTAACATCTTCCTTatctatgtgtttttgtcattttcataggcaaacaacaataag cagtggctagaaattgatctactcaagatcaagaagataacggcaattataacacagggctgcaa gtctctgtcctctgaaatgtatgtaaagagctataccatccactacagtgagcagggagtggaat ggaaaccatacaggc[t/a]gaaatcctccatggtggacaaggtagagtggcatctgggcaaaga gAAAGCAATCTGAAGACTGTGC	282
F5u24	F5	A	T	G	G	cds	GE267	TGATGACCCTGAATACAGACATAGT	AGTTTTAAATGTTGATGCTGGTATT	TGATGACCCTGAATACAGACATAGTttaaatatttgttttcacaggacttcttggcctacttta tatgctgaagtcgg[a/t]gacatcataaaagttcactttaaaaataaggcagataagcccttga gcatccatcctcaaggaattaggtacagtaaattatcagaaggtaagataaatctaatattttc tgaaaagggaaaatgtctaagtctttAATACCAGCATCAACATTTAAAACT	246
F5u25	F5	G	T	S	S	cds	GE362	GCTATCCCAGATTTGAGAGTGGT	TTTGTCCCATGACAGAACTCC	GCTATCCCAGATTTGAGAGTGGTgaaaacgcaatcctcagaaactgcccacatgtcttgatggct gttactcctccaggtgcttcttaccttgaccacacattccctgcggagaagatggacgacgctgt ggctccaggccgagaatacacctatgaatggagtatcagtgaggacagtggacccacccatgatg accctccatgcctcacacacatctattactcccatgaaaatctgatcgaggatttcaactc[g/t]gggctgattggcccctgcttatctgtaaaaaaggtaagaacacccccaccaaaagattcaaca actaaatgttggaatggtcaGGAGTTCTGTCATGGGACAAA	366

FIG. 5AAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u26	F5	C	T	-	-	noncoding	GE924	TTGCTTGCCCTAAACTCTTTG	GAAAACAGGACCGAAAAATTACTA	TTGCTTGCCCTAAACTCTTTGntatccaggaaagntaatgagngtntttatctgcagtgctactgaaaacaagtctttcctttcatagggaccctaactgagggtgggacacagaagacgtttgacaagcaaatcgtgctactatttgctgtgtttgatgaaagcaagagctggagccagtcatcatccctaatgtacacagtcaatggatatgtgaatgggacaatgccaggtaaca[c/t]gagggctgtgtaccattaaacaacagtaaaatcatTAGTAATTTTTCGGTCCTGTTTTC	303
F5u27	F5	A	G	E	E	cds	GE494	TCTGTCTCTCTTCTGTAGGAACT	CCCTGTGACATCTGGCTGTAG	TCTGTCTCTCTTCTGTAGGAACTtggatgttaacttccatgaattctagtccaagaagcaaaaagctgaggctgaaattcagggatgttaaatgtatcccagatgatgatgaagactcatatgagattttgaacctccagaatctacagtcatggctacacggaaaatgcatgatcgtttagaacctgaagatgaagagagtgatgctgactatgattaccagaacagactggctgcagcattaggaattaggtcattccgaaactcatcattgaaccaggaagaagaagagttcaatcttactgccctagctctggagaatggcactga[a/g]ttcgtttcttcgaacacagatataattgttggttcaaattattcttccccaagtaatattagtaagttcactgtcaataaccttgcagaacctcagaaagccccttctcaccaacaagccaccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctCTACAGCCAGATGTCACAGGG	585
F5u28	F5	C	T	S	S	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacagcagagcattccag[c/t]ccatattctgaagaccctatagaggatcctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggaggaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagatttggttgggagatggcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgttaacaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u29	F5	A	T	K	*	cds	GE389	GAAAGGTAGCTATGAAATAATCCAAGA	GGGTCTTGAATGGGGAATGT	GAAAGGTAGCTATGAAATAATCCAAGAtactgatgaagacacagctgttaacaattggctgatcagcccccagaatgcctcacgtgcttggggagaaagcacccctcttgccaacaagcctggaaagcagagtggccacccaaagtttcctagagttagacataaatctctacaagtaagacaggatggaggaaagagtagactgaagaaaagccagtttctcattaagacacgaaaaaagaaaaaagagaagcacacaccatgctcctttatctccgaggacctttcaccctctaagaagtgaagcctacaacacatttcagaaagaagacttaagcattcgttggtgcttcat[a/t]aatccaatgaaacatctcttcccacagacctcaatcagacattgccctctatggatttggctggatagcctcacttcctgaccataatcagaattcctcaaatgacactggtcaggcaagctgtcctccaggtctttatcagacagtgcccccagaggaacactatcaaACATTCCCCATTCAAGACCC	553
F5u3	F5	G	A	R	Q	cds	GE47	GAAATAACTTTGCAAATGAAAACA	TTTCTGAAAGGTTACTTCAAGGAC	GAAATAACTTTGCAAATGAAAACAatttgaatatatttctttcaggcaggaacaacaccatgatcagagcagttcaaccaggggaaacctatacttataagtggaacatcttagagtttgatgaacccacagaaaatgatgcccagtgcttaacaagaccatactacagtgacgtggacatcatgagagacatcgcctctgggctaataggactacttctaatctgtaagagcagatccctggacaggc[g/a]aggaatacaggtattttGTCCTTGAAGTAACCTTTCAGAAA	297

FIG. 5BBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u30	F5	C	A	P	T	cds	GE389	GAAAGGTAGCTATGAAATAATCCAAGA	GGGTCTTGAATGGGGAATGT	GAAAGGTAGCTATGAAATAATCCAAGAtactgatgaagacacagctgttaacaattggctgatcagcccccagaatgcctcacgtgcttggggagaaagcacccctcttgccaacaagcctggaaagcagagtggccacccaaagtttcctagagttagacataaatctctacaagtaagacaggatggaggaaagagtagactgaagaaaagccagtttctcattaagacacgaaaaaagaaaaaagagaagcacacacaccatgctcctttatctccgaggacctttcaccctctaagaagtgaagcctacaacacattttcagaaagaagacttaagcattcgttggtgcttcataaatccaatgaaacatctcttcccacagacctcaatcagacattgccctctatggattttggctggatagcctcactt[c/a]ctgaccataatcagaattcctcaaatgacactggtcaggcaagctgtcctccaggtctttatcagacagtgcccccagaggaacactatcaaACATTCCCCATTCAAGACCC	553
F5u31	F5	G	A	M	I	cds	GE925	CACTCGCCCTCTCTGTGTC	CAGATTGCCTTTTCCCTGTATT	CACTCGCCCTCTCTGTGTCaacagattttaattgatttcaactcttngtcnnttcagccattaatgggatgatctacagcttgcctggcctgaaaat[g/a]tatgagcaagagtgggtgaggttacacctgctgaacataggcggctcccaagacattcacgtggttcactttcacggccagaccttgctggaaaatggcaataaacagcaccagttaggggtctggccccttctgcctggtaaagattgggtaatgggaagagggccctgctaagaAATACAGGGAAAAGGCAATCTG	301
F5u32	F5	T	G	F	V	cds	GE910	GCAGGGAATATTGGTGTG	TTTACTGATACAATGGCAGAGTT	GCAGGGAATATTGGTGTGtaattaatcacggaaaccaccacatgacaggatgttccacaccccctgggtatggaaaatggaaagatagaaaacaagcaaatcacagcttcttcg[t/g]ttaagaaatcttggtggggagattactgggaacccttccgtgcccgtctgaatgcccagggacgtgtgaatgcctggcaagccaaggtcaagtatactctatgcatggtgttctcttagggctccaaaaaaaagcaaaggccctcactaccacaaacatggaggatctgggaagcaggagtattttaatctgtttctgcaaattaaaatcctaggtccaanagtccaggatgtctgtggacttgatanctttgactataactttgtctcaaaaanaagtcatttatcatctctgtggttttggtctattcttgatttaaaccaataataagcaattaatttttctgcaaagggatanatggtaaatattttagtctttgtggccatacattctctgccataactactcAACTCTGCCATTGTATCAGTAAA	552
F5u33	F5	A	G	D	G	cds	GE921	AAAAACCTTAGCCATTTATGTTGT	AAGAAAGAGAAATAGTGGAAAAC	AAAAACCTTAGCCATTTATGTTGTcattaaagatttctcttatttggctttcagattttgaaggaaatactaataccaaaggacatgtgaagaacttttcaacccccaatcatttccaggtttatccgtgtcattcctaaaacatggaatcaaagtattgcacttcgcctggaactctttggctgtg[a/g]tatttactagaattgaacattcaaaacccctggaagagactctttaagacctcaaaccattagaatgggcaatgtatttacgctgtgttaaatgttaacaGTTTTCCACTATTTCTCTTTCTT	322
F5u34	F5	A	G	Q	Q	cds	GE932	TCTACTAGAAGTCTGAAGATATGAGAG	TGCCAAATTACCCATAGAAAT	TCTACTAGAAGTCTGAAGATATGAGAGatctactttttttgtaatgtgagaaatagatattgaatatgcctttcaaattagttttgtatttatttccagtttgaatctttctgtaacttcctttaagaaaattgtctacagagagtatgaaccatatttaagaaagaaaaaccaca[a/g]tctaccatttcaggtaagcctgaaatatactttttaatttaaagataaATTTCTATGGGTAATTTGGCA	255
F5u35	F5	G	A	A	A	cds	GE362	GCTATCCCAGATTTGAGAGTGGT	TTTGTCCCATGACAGAACTCC	GCTATCCCAGATTTGAGAGTGGTgaaaacgcaatcctcagaaactgcccacatgtcttgatggctgttactcctccaggtgcttcttaccttgaccacacattccctgc[g/a]gagaagatggacgacgctgtggctccaggccgagaatacacctatgaatggagtatcagtgaggacagtggacccacccatgatgaccctccatgcctcacacacatctattactcccatgaaaatctgatcgaggatttcaactcggggctgattgggcccctgcttatctgtaaaaaggtaagaacacccccaccaaaagattcaacaactaaatgttggaatggtcaGGAGTTCTGTCATGGACAAA	366
F5u36	F5	G	A	V	M	cds	GE915	TGATTATCAGAAGAGCAAGGAAA	ACTGTGACCCAGTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccaggaaaaagatattcactcaggcttgataggtcccctcctaatctgccaaaaggaata-tacataaggacagcaacatgcct[g/a]tggacatgagagaatttgtcttactatttatgacctttgatgaaaagaagagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaaaatcccatgagtttcacggtattttcctcggactttgatctaatctcctaatTAAATCACACTGGGTCACAGT	334

FIG. 5CCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u37	F5	C	T	P	S	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttcc[c/t]cactgagacacctcattggcaagaactcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggaggaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatggcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgttaacaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u38	F5	G	C	E	D	cds	GE362	GCTATCCCAGATTTGAGAGTGGT	TTTGTCCCATGACAGAACTCC	GCTATCCCAGATTTGAGAGTGGTgaaaacgcaatcctcagaaactgcccacatgtcttgatggctgttactcctccaggtgcttcttaccttgaccacacattccctgcgga[g/c]aagatggacgacgctgtggctccaggccgagaatacacctatgaatggagtatcagtgaggacagtggacccacccatgatgaccctccatgcctcacacacatctattactcccatgaaaatctgatcgaggatttcaactcggggctgattgggcccctgcttatctgtaaaaaaggtaagaacacccccaccaaaagattcaacaactaaatgttggaatggtcaGGAGTTCTGTCATGGGACAAA	366
F5u39	F5	G	A	E	K	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaacatgctaagcgtaagggacccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgg[g/a]aggaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatggcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgttaacaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u4	F5	T	C	M	T	cds	GE172	TTTAAGAAAATACAGGTCTCAGCAT	TTTCTCCCATGATTCTGTATTTGT	TTTAAGAAAATACAGGTCTCAGCATttggataatttctcaaaccaaattggaaaacattataagaaagttatgtacacacagtacgaagatgagtccttcaccaaacatacagtgaatcccaata[t/c]gaaagaagatgggatttgggtcctattatcagagcccaggtcagagacacactcaaagtaagtaacACAAATACAGAATCATGGGAGAAA	221
F5u40	F5	C	G	P	A	cds	GE391	CCCCTTCTCACCAACAAGC	AGCACGTGAGGCATTCTGG	CCCCTTCTCACCAACAAGCcaccacagctggttccccactgagacacctcattggcaagaactcagttctcaattcttccacagcagagcattccagcccatattctgaagaccctatagaggatcctctacagccagatgtcacagggatacgtctactttcacttggtgctggagaattcagaagtcaagaacatgctaagcgtaaggga[c/g]ccaaggtagaaagagatcaagcagcaaagcacaggttctcctggatgaaattactagcacataaagttgggagacacctaagccaagacactggttctccttccggaatgaggccctgggaggaccttcctagccaagacactggttctccttccagaatgaggccctgggaggaccctcctagtgatctgttactcttaaaacaaagtaactcatctaagattttggttgggagatggcatttggcttctgagaaaggtagctatgaaataatccaagatactgatgaagacacagctgttaacaattggctgatcagcccCCAGAATGCCTCACGTGCT	558
F5u41	F5	C	G	L	V	cds	GE915	TGATTATCAGAAGAGCAAGGAAA	ACTGTGACCCAGTGTGATTTA	TGATTATCAGAAGAGCAAGGAAAttcctgagaaagaggcaatacaatttactctgtttttccaggaaaaagatattcactcaggcttgataggtcccctc[c/g]taatctgccaaaaaggaata-tacataaggacagcaacatgcctatggacatgagagaatttgtcttactatttatgacctttgatgaaaagaagagctggtactatgaaaagaagtcccgaagttcttggagactcacatcctcagaaatgaaaaaatcccatgagtttcacggtattttcctcggactttgatctaatctcctaatTAAATCACACTGGGTCACAGT	334

FIG. 5DDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u42	F5	T	G	Y	D	cds	GE279	GAATTTAGGCAGTGTGTGACTTG	AGAGATTCAGATAGAAATATGCACAC	GAATTTAGGCAGTGTGTGACTTGttgacaaggacagttctgtttactggctttcctatattgcaggtggacatgcaaaaggaagtcataatcacagggatccagacccaaggtgccaaacactacctgaagtcctgctataccacagagttc[t/g]atgtagcttacagttccaaccagatcaactggcagatcttcaaagggaacagcacaaggaatgtgatggtttGTGTGCATATTTCTATCTGAATCTCT	255
F5u44	F5	C	A	L	I	cds	GE395	GACCTCAGCCAGACAAACCT	TCTGATCAAGGTCTGGAGGA	GACCTCAGCCAGACAAACCTctctccagaactcagtcagacaaacctttctccagccctcggtcagatgcccctttctccagacctcagccatacaaccctttctctagacttcagccagacaaacctctctccagaactcagccatatgactctctctccagaactcagtcagacaaacctttccccagccctcggtcagatgcccatttctccagacctcagccatacaacc[c/a]tttctctagacttcagccagacaaacctctctccagaactcagtcaaacaaacctttccccagccctcggtcagatgcccctttctccagaccccagccatacaaccctttctctagacctcagccagacaaacctctctccagaactcagtcagacaaacctttccccagacctcagtgagatgcccctctttgcagatctcagtcaaattccccttaccccagacctcgaccagatgacactttctccagaccttggtgagacagatctttccccaaactttggtcagatgtccctttccccagacctcagccaggtgactctctctccagacatcagtgacaccacccttctcccggatctcagccagatatcaccTCCTCCAGACCTTGATCAGA	638
F5u45	F5	T	A	L	I	cds	GE923	GATCATTCCTTTTCCTAGGTT	TTCAGATTACGAGGTTAGGGGA	GATCATTCCTTTTCCTAGGTTcgttttaaaaat[t/a]tagcatccagaccgtattctctacatgcccatggactttcctatgaaaaatcatcagagggaaagacttatgaagatgactctcctgaatggtttaaggaagataatgctgttcagccaaatagcagttatacctacgtatggcatgccactgagcgatcagggccagaaagtcctggctctgcctgtcgggcttgggcctactactcagctgtgaacccagtaggtactttcattgaaagtttttctcatTCCCCTAACCTCGTAATCTGAA	311
F5u46	F5	C	A	L	I	cds	GE387	GTGCCCCCAGAGGAACACTA	TCATATGGCTGAGTTCTGGAG	GTGCCCCCAGAGGAACACTAtcaaacattccccattcaagaccctgatcaaatgcactctacttcagaccccagtcacagatcctcttctccagagctcagtgaaatgcttgagtatgaccgaagtcacaagtccttccccacagatataagtcaaatgtccccttcctcagaacatgaagtctggcagacagtcatctctccagacctcagccaggtgaccctctctccagaactcagccagacaaacctctctccagacctcagccacacgactctctctccagaactcattcagagaaacctttccccagccctcggtcagatgcccatttctccagacctcagccatacaaccctttctccagacctcagccatacaaccctttctttagacctcagccagacaaacctctctccagaactcagtcagacaaacctttctccagccctcggtcagatgcccctttctccagacctcagccatacaacc[c/a]tttctctagacttcagccagacaaacctctCTCCAGAACTCAGCCATATGA	548
F5u5	F5	A	G	K	K	cds	GE172	TTTAAGAAAATACAGGTCTCAGCAT	TTTCTCCCATGATTCTGTATTTGT	TTTAAGAAAATACAGGTCTCAGCATttggataatttctcaaaccaaattggaaaacattataagaaagttatgtacacacagtacgaagatgagtccttcaccaaacatacagtgaatcccaatatgaa[a/g]gaagatgggatttgggtcctattatcagagcccaggtcagagacacactcaaagtaagtaacACAAATACAGAATCATGGGAGAAA	221
F5u6	F5	G	A	E	E	cds	GE174	TCTATGCGTCTGTTCTTGTACC	CAACCACAGGAATGAAAAACTG	TCTATGCGTCTGTTCTTGTACCagtactatactgttttgtcctccagagggcagcagacatcgaacagcaggctgtgtttgctgtgtttgatgagaacaaaagctggtaccttgaggacaacatcaacaagttttgtgaaaatcctgatga[g/a]gtgaaacgtgatgaccccaagttttatgaatcaaacatcatgagcagtaagtcagagtactattttgttcatCAGTTTTTCATTCCTGTGGTTG	251
F5u7	F5	C	A	T	T	cds	GE175	TTTTACACTTTCAGCTATCAATGG	GCTTCCTCTGTGAGTGTCCAG	TTTTACACTTTCAGCTATCAATGGctatgtgcctgagagcataactactcttggattctgctttgatgacactgtccagtggcacttctgtagtgtggggacccagaatgaaattttgaccatccacttcactgggcactcattcatctatggaaagaggcatgaggacaccttgac[c/a]ctcttccccatgcgtggagaatctgtgacggtcacaatggataatgttggtgagtaagagtCTGGACACTCACAGAGGAAGC	264

FIG. 5EEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F5u8	F5	G	T	-	-	noncoding	GE174	TCTATGCGTCTGTTCTTGTACC	CAACCACAGGAATGAAAAACTG	TCTATGCGTCTGTTCTTGTACCagtactatactgtttt[g/t]tcctccagagggcagcagacatcgaacagcaggctgtgtttgctgtgtttgatgagaacaaaagctggtaccttgaggacaacatcaacaagttttgtgaaaatcctgatgaggtgaaacgtgatgaccccaagttttatgaatcaaacatcatgagcagtaagtcagagtactattttgttcatCAGTTTTTCATTCCTGTGGTTG	251
F5u9	F5	A	T	Y	F	cds	GE932	TCTACTAGAAGTCTGAAGATATGAGAG	TGCCAAATTACCCATAGAAAT	TCTACTAGAAGTCTGAAGATATGAGAGatctactttttttgtaatgtgagaaatagatattgaatatgcctttcaaattagttttgtatttatttccagtttgaatctttctgtaacttcctttaagaaaattgtctacagagagtatgaaccat[a/t]ttttaagaaagaaaaaccacaatctaccatttcaggtaagcctgaaatatactttttaatttaaagataaATTTCTATGGGTAATTTGGCA	255
F7d10	F7	G	A	-	-	noncoding	GE293	ACCCTTGGAGGCAGAGAAC	AAAACCCTCCTGGTGGATG	ACCCTTGGAGGCAGAGAACtttgcccgtcagtcccatggggaatgtcaacaggcaggggcagcactgcagagatttcatcatggtctcccaggccctcaggctcctctgccttctgcttgggcttcagggctgcctggctgcaggtgcgtcc[g/a]gggaggtttctccataaacttggtggaagggcagtgggcaaatccaggagccagcccgggcttcccaaaccccgcccttgctccggacaccccCATCCACCAGGAGGGTTTT	270
F7d11	F7	C	T	D	D	cds	GE354	GCAGAACACCACTGCTGACC	CGTCTTTTGTCCAGTAAGATAATCC	GCAGAACACCACTGCTGACCcaggggcatggccaccccgggggctggcgtctcgctgacccccagaagcccctctcagggtgtccccttcctgtccccagacaaggatgaccagctgatctgtgtgaacgagaacggcggctgtgagcagtactgcagtgaccacacgggcaccaagcgctcctgtcggtgccacgaggggtactctctgctggcaga[c/t]ggggtgtcctgcacacccacaggtgaccaggcttcatgtcccagtcccagatgacaccagtccctgtcccactaGGATTATCTTACTGGACAAAAGACG	322
F7d12	F7	G	A	-	-	noncoding	GE412	CCCTGCAGACCTAGAAATGG	CCCCATTAACTGCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccagggggtgaggtggcaggtggtggaaagggcctga[g/a]gggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatgagcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgttctgtgccggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacatgccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaaccgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgcgctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctgtggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTTAATGGGG	787
F7u1	F7	C	T	H	H	cds	GE354	GCAGAACACCACTGCTGACC	CGTCTTTTGTCCAGTAAGATAATCC	GCAGAACACCACTGCTGACCcaggggcatggccaccccgggggctggcgtctcgctgacccccagaagcccctctcagggtgtccccttcctgtccccagacaaggatgaccagctgatctgtgtgaacgagaacggcggctgtgagcagtactgcagtgaccacacgggcaccaagcgctcctgtcggtgcca[c/t]gaggggtactctctgctggcagacggggtgtcctgcacacccacaggtgaccaggcttcatgtcccagtcccagatgacaccagtccctgtcccactaGGATTATCTTACTGGACAAAAGACG	322
F7u2	F7	G	T	G	G	cds	GE296	TGTTTCTGAATCTTTCCTAGTGG	CAGAGCTGTTGTTCACATTCAA	TGTTTCTGAATCTTTCCTAGTGGcacgttcatccctcacaaatctctgcatctttctgactttgttttacacagttgaatatccatgtggaaaaatacctattctagaaaaaagaaatgccagcaaaccccaaggccgaattgtgggggcaaggtgtgccccaaagg[g/t]gagtgtccatggcaggtaaggcttcccctggcttcaggattccaagccctgagggtcttgaagcctTTGAATGTGAACAACAGCTCTG	263

FIG. 5FFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F7u3	F7	G	T	G	V	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccagggggtgaggtggcaggtggtggaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatgagcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatgacccaggactgcctgcagcagtcacggaaggtgg[g/t]agactccccaaatatcacggagtacatgttctgtgccggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacatgccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaaccgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgcgctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctgtggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTTAATGGGG	787
F7u4	F7	C	A	D	E	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccagggggtgaggtggcaggtggtggaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatgagcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgttctgtgccggctactcggatggcagcaagga[c/a]tcctgcaagggggacagtggaggcccacatgccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaaccgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgcgctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctgtggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTTAATGGGG	787
F7u5	F7	C	T	T	T	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccagggggtgaggtggcaggtggtggaaagggcctgaggggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatgagcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcac[c/t]accaaccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgttctgtgccggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacatgccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaaccgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgcgctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctgtggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTTAATGGGG	787

FIG. 5GGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F7u6	F7	A	T	E	V	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgagggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccac gacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcct gcccgaacggacgttctctg[a/t]gaggacgctggccttcgtgcgcttctcattggtcagcggc tggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggct gatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtaca tgttctgtgccggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787
F7u7	F7	C	T	A	A	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgagggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccac gacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcct gcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggg gccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatg acccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgtt ctgtgc[c/t]ggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787
F7u8	F7	T	A	V	D	cds	GE412	CCCTGCAGACC TAGAAATGG	CCCCATTAACT GCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccaggggtgaggtggcaggtggtg gaaagggcctgagggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatg agcagagccggcgggtggcgcaggtcatcatccccagcacgtacg[t/a]cccgggcaccaccaa ccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctct gcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggc tggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggct gatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtaca tgttctgtgccggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacat gccacccactaccggggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaac cgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgc gctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctg tggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTT AATGGGG	787

FIG. 5HHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F7u9	F7	G	A	R	Q	cds	GE412	CCCTGCAGACCTAGAAATGG	CCCCATTAACTGCAGAAGAATA	CCCTGCAGACCTAGAAATGGccacagcccatccccatgcaccagggggtgaggtggcaggtggtggaaagggcctgagggggcttcttccttccaggcgagcacgacctcagcgagcacgacggggatgagcagagccggcgggtggcgcaggtcatcatccccagcacgtacgtcccgggcaccaccaaccacgacatcgcgctgctccgcctgcaccagcccgtggtcctcactgaccatgtggtgcccctctgcctgcccgaacggacgttctctgagaggacgctggccttcgtgcgcttctcattggtcagcggctggggccagctgctggaccgtggcgccacggccctggagctcatggtcctcaacgtgccccggctgatgacccaggactgcctgcagcagtcacggaaggtgggagactccccaaatatcacggagtacatgttctgtgccggctactcggatggcagcaaggactcctgcaagggggacagtggaggcccacatgccacccactacc[g/a]gggcacgtggtacctgacgggcatcgtcagctggggccagggctgcgcaaccgtgggccactttggggtgtacaccagggtctcccagtacatcgagtggctgcaaaagctcatgcgctcagagccacgcccaggagtcctcctgcgagccccatttccctagcccagcagccctggcctgtggagagaaagccaaggctgcgtcgaactgtcctggcaccaaatcccataTATTCTTCTGCAGTTAATGGGG	787
F9d8	F9	G	T	-	-	noncoding	GE338	TTCAGATGCAGAGCATAGAATAGA	TGGACTGATCTTTCTGAGTCCTT	TTCAGATGCAGAGCATAGAATAGAaaatcttaaaaagacacttctctttaaattttaaagcatccatatatatttatgtat[g/t]ttaaatgttataaaagataggaaatcaataccaaaacactttagatattaccgttaatttgtcttctttttattctttatagactgaattttggaagcagtatgttggtaagcaattcattttatcctctagctaatatatgaaacatatgagaattatgtgggtttttctctgcataaatagataatatattaaactttgtcaaAAGGACTCAGAAAGATCAGTCCA	316
F9u1	F9	G	A	A	T	cds	GE364	GGCCTCAATCTCAATTTTTGTAAT	AATAGCCTCAGTCTCCCACCT	GGCCTCAATCTCAATTTTTGTAATacatgttccatttgccaatgagaaatatcaggttactaatttttcttctatttttctagtgccatttccatgtggaagagtttctgtttcacaaacttctaagctcacccgtgctgag[g/a]ctgtttttcctgatgtggactatgtaaattctactgaagctgaaaccatttggataacatcactcaaagcacccaatcatttaatgacttcactcgggttgttggtggagaagatgccaaaccaggtcaattcccttggcaggtactttatactgatggtgtgtcaaaactggagctcagctggcaagacacaggccAGGTGGGAGACTGAGGCTATT	366
F9u2	F9	A	T	K	N	cds	GE342	TTTTGCCTATTCCTGTAACCAG	GCCCAATTTATTCAACAACAAT	TTTTGCCTATTCCTGTAACCAGcacacatatttattttttctagatcaaatgtattatgcagtaagagtcttaatttgttttcacaggttgttttgaatggtaa[a/t]gttgatgcattctgtggaggctctatcgttaatgaaaaatggattgtaactgctgcccactgtgttgaaactggtgttaaaattacagttgtcgcaggtaaatacacagaaagaataataatctgcagcaccactagctctttaatatgattggtacaccatattttactaaggtctaataaaATTGTTGTTGAATAAATTGGGC	316
F9u3	F9	G	T	R	R	cds	GE364	GGCCTCAATCTCAATTTTTGTAAT	AATAGCCTCAGTCTCCCACCT	GGCCTCAATCTCAATTTTTGTAATacatgttccatttgccaatgagaaatatcaggttactaatttttcttctatttttctagtgccatttccatgtggaagagtttctgtttcacaaacttctaagctcacccgtgctgaggctgtttttcctgatgtggactatgtaaattctactgaagctgaaaccattttggataacatcactcaaagcacccaatcatttaatgacttcactcg[g/t]gttgttggtggagaagatgccaaaccaggtcaattcccttggcaggtactttatactgatggtgtgtcaaaactggagctcagctggcaagacacaggccAGGTGGGAGACTGAGGCTATT	366
F9u4	F9	A	G	-	-	noncoding	GE303	CAATGAGTATCTACAGGGGAGGA	CACCAATATTGCATTTTCCAGT	CAATGAGTATCTACAGGGGAGGAccgggcattctaagcagtttacgtgccaattcaatttcttaacctatctcaaagatggagatcagtgtgagtccaatccatgtttaaatggcggcagttgcaaggatgacattaattcctatgaatgttggtgtccctttggatttgaaggaaagaactgtgaattaggtaagt[a/g]actatttttgaatactcatggttcaaagtttccctctgaaacaagttgaaACTGGAAAATGCAATATTGGTG	275

FIG. 5III

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
F9u5	F9	A	G	E	G	cds	GE403	TGGTCCCAAGTAGTCACTTAGAAAAT	TCTAACAAAAGATGGGAAAGTGAT	TGGTCCCAAGTAGTCACTTAGAAAATctgtgtatgtgaaatactgtttgtgacttaaaatgaaatttatttttaataggtgaacataatattgaggagacagaacatacag[a/g]gcaaaagcgaaatgtgattcgagcaattattcctcaccacaactacaatgcagctattaataagtacaaccatgacattgcccttctggaactggacgaacccttagtgctaaacagctacgttacacctatttgcattgctgacaaggaatacacgaacatcttcctcaaatttggatctggctatgtaagtggctggggaagagtcttccacaaagggagatcagctttagttcttcagtaccttagagttccacttgttgaccgagccacatgtcttcgatctacaaagttcaccatctataacaacatgttctgtgctggcttccatgaaggaggtagagattcatgtcaaggagatagtggggggaccccatgttactgaagtggaagggaccagtttcttaactggaattattagctggggtgaagagtgtgcaatgaaaggcaaatatggaatatataccaaggtatcccggtatgtcaactggattaaggaaaaaacaaagctcacttaatgaaagatggatttccaaggttaattcattggaattgaaaattaacagggcctctcactaactaATCACTTTCCCATCTTTTGTTAGA	721
F9u6	F9	G	T	K	N	cds	GE340	CCCATACATGAGTCAGTAGTTCCAT	AGGAAGCAGATTCAAGTAGGAAT	CCCATACATGAGTCAGTAGTTCCATgtacttttagaaatgcatgttaaatgatgctgttactgtctatttgcttcttttagatgtaacatgtaacattaagaatggcagatgcgagcagttttgtaaaaatagtgctgataacaaggtggtttgctcctgtactgagggatatcgacttgcagaaaaccagaa[g/t]tcctgtgaaccagcaggtcataatctgaataagatttttaaagaaaatctgtatctgaaacttcagcattttaacaaacctacataattttaATTCCTACTTGAATCTGCTTCCT	316
F9u7	F9	A	T	E	V	cds	GE398	GGCTTTCAGATTATTTGGATTAAAAAC	TGCTTACCAACATACTGCTTCC	GGCTTTCAGATTATTTGGATTAAAAACaaagactttcttaagagatgtaaaattttcatgatgttttctttttgctaaaactaaagaattattctttacatttcagtttttcttgatcatgaaaacgccaacaaaattctgaatcggccaaagaggtataattcaggtaaattggaag[a/t]gtttgttcaagggaaccttgagagagaatgtatggaagaaaagtgtagttttgaagaagcacgagaagttttgaaaacactgaaagaacagtgagtatttccacataatacccttcagatgcagagcatagaatagaaaatctttaaaaagacacttctctttaaaatttaaagcatccatatatatttatgtatgttaaatgttataaaagataggaaatcaataccaaaacactttagatattaccgttaatttgtcttcttttattctttatagactgaattttGGAAGCAGTATGTTGGTAAGCA	496
FGAd13	FGA	T	C	-	-	noncoding	GE377	AAACTGTAACCAAAATAAAATTAGGC	AGTGCATAACTATCGCCTTCC	AAACTGTAACCAAAATAAAATTAGGCatatttacaagctagtttctttctttctttttttctctttctttctttctttctttctttctttctttctttctttctttctttctccttccttcctttcttcctttctttttttgctggcaattacagacaaatcactcagcagctacttcaataaccatatttcgatttcagaccgtgataatacctacaaccgagtgtcagaggatctgagaagcagaattgaagtcctgaagcgcaaagtcatagaaaaagtacagcatatccagcttctgcagaaaaatgttagagctcagttggttgatatgaaacgactggaggtaagtatgtggctgtggtcccgagtgtccttgttt[t/c]tgagtagagggaaaaGGAAGGCGATAGTTATGCACT	426
FGAu1	FGA	A	G	D	G	cds	GE377	AAACTGTAACCAAAATAAAATTAGGC	AGTGCATAACTATCGCCTTCC	AAACTGTAACCAAAATAAAATTAGGCatatttacaagctagtttctttctttctttttttctctttctttctttctttctttctttctttctttctttctttctttctttctccttccttcctttcttcctttctttttttgctggcaattacagacaaatcactcagcagctacttcaataaccatatttcgatttcagaccgtgataatacctacaaccgagtgtcagaggatctgagaagcagaattgaagtcctgaagcgcaaagtcatagaaaaagtacagcatatccagcttctgcagaaaaatgttagagctcagttggttg[a/g]tatgaaacgactggaggtaagtatgtggctgtggtcccgagtgtccttgttttgagtagagggaaaaGGAAGGCGATAGTTATGCACT	426

FIG. 5JJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu10	FGA	G	C	A	P	cds	GE414	GAGGCCTAACA ACCCAGACT	AAAAAGTGTAG TTTCAATGACG TGTAA	GAGGCCTAACAACCCAGACTggggcacatttgaagaggtgtcaggaaatgtaagtccagggacaa ggagagagtaccacacagaaaaactggtcacttctaaaggagataaagagctcaggactggtaaa gagaaggtcacctctggtagcacaaccaccacgcgtcgttcatgctctaaaaccgttactaagac tgttattggtcctgatggtcacaaagaagttaccaaagaagtggtgacctccgaagatggttctg actgtcccgaggcaatggatttaggcacattgtctggcataggtactctggatgggttccgccat aggcaccctgatgaa[g/c]ctgccttcttcgacactgcctcaactggaaaaacattcccaggtt tcttctcacctatgttaggagagtttgtcagtgagactgagtctaggggctcagaatctggcatc ttcacaaatacaaaggaatccagttctcatcaccctgggatagctgaattcccttcccgtggtaa atcttcaagttacagcaaacaatttactagtagcacgagttacaacagaggagactccacatttg aaagcaagagctataaaatggcagatgaggccggaagtgaagccgatcatgaaggaacacatagc accaagagaggccatgctaaatctcgccctgtcagaggtatccacacttctcctttggggaagcc ttccctgtcccccctagactaagttaaatatttctgcacagtgttcccatggccccttgcatttcc ttcttaactctctgTTACACGTCATTGAAACTACACTTTTT	821
FGAu11	FGA	G	A	G	E	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacctgga atcctggcagctctgaacgcggaagtgctg[g/a]gcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu12	FGA	T	A	S	T	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaattttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacctgga atcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgta[t/a]ctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825

FIG. 5KKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu2	FGA	A	T	G	G	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccgg[a/t]aatttaagagccagcttcagaaggtacccccagagtggaaggcatt aacagacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggag gctccacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagc tggaactctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactgg agggactgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu3	FGA	A	T	M	L	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaa[a/t]tgaaaccagtt ccagacttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcatt aacagacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggag gctccacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagc tggaactctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactgg agggactgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu4	FGA	A	G	T	A	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagt[a/g]ctggaagctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825

FIG. 5LLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu5	FGA	A	G	R	G	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttattttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccct[a/g]gacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagtttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu6	FGA	C	T	T	T	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttattttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaagctggaactctgggagctc tggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtac[c/t]ggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagtttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGAu7	FGA	A	G	K	E	cds	GE414	GAGGCCTAACA ACCCAGACT	AAAAAGTGTAG TTTCAATGACG TGTAA	GAGGCCTAACAACCCAGACTggggcacatttgaagaggtgtcaggaaatgtaagtccagggacaa ggagagagtaccacacagaaaaactggtcacttctaaaggagataaagagctcaggactggt[a/ g]aagagaaggtcacctctggtagcacaaccaccacgcgtcgttcatgctctaaaaccgttacta agactgttattggtcctgatggtcacaaagaagttaccaaagaagtggtgacctccgaagatggt tctgactgtcccgaggcaatggatttaggcacattgtctggcataggtactctggatgggttccg ccataggcaccctgatgaagctgccttcttcgacactgcctcaactggaaaaacattcccaggtt tcttctcacctatgttaggagagtttgtcagtgagactgagtctaggggctcagaatctggcatc ttcacaaatacaaaggaatccagttctcatcaccctgggatagctgaattcccttcccgtggtaa atcttcaagttacagcaaacaatttactagtagcacgagttacaacagaggagactccacatttg aaagcaagagctataaaatggcagatgaggccggaagtgaagccgatcatgaaggaacacatagc accaagagaggccatgctaaatctcgccctgtcagaggtatccacacttctcctttggggaagcc ttccctgtccccctagactaagttaaatatttctgcacagtgttcccatggccccttgcatttcc ttcttaactctctgTTACACGTCATTGAAACTACACTTTTT	821

FIG. 5MMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGAu8	FGA	T	C	P	P	cds	GE414	GAGGCCTAACA ACCCAGACT	AAAAAGTGTAG TTTCAATGACG TGTAA	GAGGCCTAACAACCCAGACTggggcacatttgaagaggtgtcaggaaatgtaagtccagggacaa ggagagagtaccacacagaaaaactggtcacttctaaaggagataaagagctcaggactggtaaa gagaaggtcacctctggtagcacaaccaccacgcgtcgttcatgctctaaaaccgttactaagac tgttattggtcctgatggtcacaaagaagttaccaaagaagtggtgacctccgaagatggttctg actgtcccgaggcaatggatttaggcacattgtctggcataggtactctggatgggttccgccat aggcaccc[t/c]gatgaagctgccttcttcgacactgcctcaactggaaaaacattcccaggtt tcttctcacctatgttaggagagtttgtcagtgagactgagtctaggggctcagaatctggcatc ttcacaaatacaaaggaatccagttctcatcaccctgggatagctgaattcccttcccgtggtaa atcttcaagttacagcaaacaatttactagtagcacgagttacaacagaggagactccacatttg aaagcaagagctataaaatggcagatgaggccggaagtgaagccgatcatgaaggaacacatagc accaagagaggccatgctaaatctcgccctgtcagaggtatccacacttctcctttggggaagcc ttccctgtcccccctagactaagttaaatatttctgcacagtgttcccatggccccttgcatttcc ttcttaactctctgTTACACGTCATTGAAACTACACTTTTT	821
FGAu9	FGA	G	C	S	T	cds	GE415	TTAACTACCAG GAACTCAATAG ACG	CTGACACCTCT TCAAATGTGC	TTAACTACCAGGAACTCAATAGACGtagtttatgtatttgtatctacatttctctttatttttc tcccctctctctaggtggacattgatattaagatccgatcttgtcgagggtcatgcagtagggct ttagctcgtgaagtagatctgaaggactatgaagatcagcagaagcaacttgaacaggtcattgc caaagacttacttccctctagagataggcaacacttaccactgataaaaatgaaaccagttccag acttggttcccggaaatttaagagccagcttcagaaggtacccccagagtggaaggcattaaca gacatgccgcagatgagaatggagttagagagacctggtggaaatgagattactcgaggaggctc cacctcttatggaaccggatcagagacggaaagccccaggaaccctagcagtgctggaagctgga actctgggagctctggacctggaagtactggaaaccgaaaccctgggagctctgggactggaggg actgcaacctggaaacctgggagctctggacctggaagtactggaa[g/c]ctggaactctggga gctctggaactggaagtactggaaaccaaaaccctgggagccctagacctggtagtaccggaacc tggaatcctggcagctctgaacgcggaagtgctgggcactggacctctgagagctctgtatctgg tagtactggacaatggcactctgaatctggaagttttaggccagatagcccaggctctgggaacg cgaggcctaacaacccagactgggGCACATTTGAAGAGGTGTCAG	825
FGBd12	FGB	T	A	-	-	noncoding	GE336	GTAACCATTTC TGAAGTCATTC CT	CAATTCCATTT CATAACTATAA GCAA	GTAACCATTTCTGAAGTCATTCCTagcagaggac[t/a]cagatatatataggattgaagatctc tcaagttaagtctacatgaaaaggatggtttcttggagcttccacaaacttaaaaccatgaaaca tctattattgctactattgtgtgtttttctagttaagtcccaaggtgtcaacgacaatgaggagg tgaatttttttaaagcattattatattattagtagtattattaatataagatgtaacataatcata ttatgtgcttattttaatgaaattagcaTTGCTTATAGTTATGAAATGGAATTG	314
FGBd13	FGB	A	G	K	E	cds	GE336	GTAACCATTTC TGAAGTCATTC CT	CAATTCCATTT CATAACTATAA GCAA	GTAACCATTTCTGAAGTCATTCCTagcagaggactcagatatatataggattgaagatctctcaa gttaagtctacatg[a/g]aaaggatggtttcttggagcttccacaaacttaaaaccatgaaaca tctattattgctactattgtgtgtttttctagttaagtcccaaggtgtcaacgacaatgaggagg tgaatttttttaaagcattattatattattagtagtattattaatataagatgtaacataatcata ttatgtgcttattttaatgaaattagcaTTGCTTATAGTTATGAAATGGAATTG	314
FGBd14	FGB	T	A	-	-	noncoding	GE336	GTAACCATTTC TGAAGTCATTC CT	CAATTCCATTT CATAACTATAA GCAA	GTAACCATTTCTGAAGTCATTCCTagcagaggactcagatatatataggattgaagatctctcaa gttaagtctacatgaaaaggatggtttcttggagcttccacaaacttaaaaccatgaaacatcta ttattgctactattgtgtgtttttctagttaagtcccaaggtgtcaacgacaatgaggaggtgaa tttttaaagcattattata[t/a]tattagtagtattattaatataagatgtaacataatcata ttatgtgcttattttaatgaaattagcaTTGCTTATAGTTATGAAATGGAATTG	314

FIG. 5NNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGBd15	FGB	C	T	P	L	cds	GE350	TTTCAAAGGTCTATAATAACACACTCC	ACACCTGGCCTTGTTTCCTG	TTTCAAAGGTCTATAATAACACACTCCttagtaacttatgtaatgttattttaaagaattggtgactaaatacaaagtaattatgtcataaacccctgaacataatgttgtcttacatttgcagaatgtgaggaaattatcaggaaaggaggtgaaacatctgaaatgtatctcattcaacctgacagttctgtcaaac[c/t]gtatagagtatactgtgacatgaatacagaaaatggaggtaagctttcgacagttgttgacctgttgatctgtaattatttggataccgtaaaatgcCAGGAAACAAGGCCAGGTGT	321
FGBd16	FGB	T	C	C	C	cds	GE351	CGCTGAATTTTCCTATGTGCTATT	TGCATTCTCGTGGCAGTCTA	CGCTGAATTTTCCTATGTGCTATTttaacaaatgtccatgacccaaatccttcatctaatgcctgctatttctttgtttttaggggtgttgtg[t/c]cctacaggatgtcagttgcaagaggctttgctacaacaggaaaggccaatcagaaatagtgttgatgagttaaataacaatgtggaagctgtttcccagacctcctcttcttcctttcagtacatgtatttgctgaaagacctgtggcaaaagaggcagaagcaagtaaaaggtagatatccttgtgctttccattcgattttcagctataaaattggaaccgtTAGACTGCCACGAGAATGCA	344
FGBd17	FGB	T	A	-	-	noncoding	GE392	AAGGGAAGAAAGGCAGTTTT	CCCAGGAAGTGGTAGCTATTAAA	AAGGGAAGAAAGGCAGTTTTtagtttcccaaaatttttattttggtgagagatttttattt[t/a]gtttttcttttaggtgaatattggcttggaaatgataaaattagccagcttaccaggatgggacccacagaactttgatagaaatggaggactggaaaggagacaaagtaaaggctcactatggaggattcactgtacagaatgaagccaacaaataccagatctcagtgaacaaatacagaggaacagccggtaatgccctcatggatggagcatctcagctgatgggagaaaacaggaccatgaccattcacaacggcatgttcttcagcacgtatgacagagacaatgacggctggtatgtgtggcactctttgctcctgctttaaaaatcacactaatatcattactcagaatcattaacaatattTTTAATAGCTACCACTTCCTGGG	459
FGBu1	FGB	C	T	S	S	cds	GE390	TCATAACTGCTTGGTGATAGCTC	CCACTTAGCATTTTTGTTGTTG	TCATAACTGCTTGGTGATAGCTCagtgtttaatagtttattctcagaaaatcaaaattgtatagttaaatacattagttttatgaggcaaaaatgctaactatttctacataatttcatttttccagataatgaaaatgtagtcaatgagtactcctcagaactggaaaagcaccaattatatatagatgagactgtgaatag[c/t]aatatcccaactaaccttcgtgtgcttcgttcaatcctggaaaacctgagaagcaaaatacaaaagttagaatctgatgtctcagctcaaatggaatattgtcgcaccccatgcactgtcagttgcaatattcctgtggtgtctggcaaaggtaactgattcataaacatattttagagagttccagaagaactcacacaccaaaaataagagaacaacaaCAACAACAAAAATGCTAAGTGG	452
FGBu10	FGB	G	T	S	I	cds	GE351	CGCTGAATTTTCCTATGTGCTATT	TGCATTCTCGTGGCAGTCTA	CGCTGAATTTTCCTATGTGCTATTttaacaaatgtccatgacccaaatccttcatctaatgcctgctatttctttgtttttaggggtgttgtgtcctacaggatgtcagttgcaagaggctttgctacaacaggaaaggccaatcagaaata[g/t]tgttgatgagttaaataacaatgtggaagctgtttcccagacctcctcttcttcctttcagtacatgtatttgctgaaagacctgtggcaaaagaggcagaagcaagtaaaaggtagatatccttgtgctttccattcgattttcagctataaaattggaaccgtTAGACTGCCACGAGAATGCA	344
FGBu11	FGB	A	G	S	S	cds	GE392	AAGGGAAGAAAGGCAGTTTT	CCCAGGAAGTGGTAGCTATTAAA	AAGGGAAGAAAGGCAGTTTTtagtttcccaaaatttttattttggtgagagatttttatttgtttttcttttaggtgaatattggcttggaaatgataaaattagccagcttaccaggatgggacccacagaactttgatagaaatggaggactggaaaggagacaaagtaaaggctcactatggaggattcactgtacagaatgaagccaacaaataccagatctc[a/g]gtgaacaaatacagaggaacagccggtaatgccctcatggatggagcatctcagctgatgggagaaaacaggaccatgaccattcacaacggcatgttcttcagcacgtatgacagagacaatgacggctggtatgtgtggcactctttgctcctgctttaaaaatcacactaatatcattactcagaatcattaacaatattTTTAATAGCTACCACTTCCTGGG	459

FIG. 5OOO

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGBu2	FGB	A	T	E	V	cds	GE390	TCATAACTGCTTGGTGATAGCTC	CCACTTAGCATTTTTGTTGTTG	TCATAACTGCTTGGTGATAGCTCagtgtttaatagtttattctcagaaaatcaaaattgtatagttaaatacattagttttatgaggcaaaaatgctaactatttctacataatttcatttttccagataatg[a/t]aaatgtagtcaatgagtactcctcagaactggaaaagcaccaattatatatagatgagactgtgaatagcaatatcccaactaaccttcgtgtgcttcgttcaatcctggaaaacctgagaagcaaaatacaaaagttagaatctgatgtctcagctcaaatggaatattgtcgcaccccatgcactgtcagttgcaatattcctgtggtgtctggcaaaggtaactgattcataaacatattttagagagttccagaagaactcacacaccaaaaataagagaacaacaaCAACAACAAAAATGCTAAGTGG	452
FGBu3	FGB	G	T	V	V	cds	GE330	GGGATTCAGATATTATTTTCAAAGTG	GCTTCCAACAATGAATGTTTTT	GGGATTCAGATATTATTTTCAAAGTGacattatttgctgttggttaatatatgctctttttgtttctgtcaaccaaaggatggacagt[g/t]attcagaaccgtcaagacggtagtgttgactttggcaggaaatgggatccatataaacagggatttggaaatgttgcaaccaacacagatgggaagaattactgtggcctaccaggtaacgaacaggcatgcaaaataaaatcattctatttgaaatgggattttttaattaAAAAACATTCATTGTTGGAAGC	289
FGBu4	FGB	G	A	R	K	cds	GE382	ATGGGTAATCTGCAAAACGTA	TCAAAAAGTCACACTCACGTCTG	ATGGGTAATCTGCAAAACGTAacttgaccaccgtagttctgtttctaataacgccaaacacatttctttcaggttaacatcagatcccagaaaacagtgttctaaagaagacggtggtggatggtggtataatagatgtcatgcagccaatccaaacggcagatactactggggtggacagtacacctgggacatggcaaagcatggcacagatgatggtgtagtatggatgaattggaaggggtcatggtactcaatga[g/a]gaagatgagtatgaagatcaggcccttcttcccacagcaatagtccccaatacgtagattttgctcttctgtatgtgacaacattttgtacattatgttattggaatttctttcatacattatattcctctaaaactctcaagCAGACGTGAGTGTGACTTTTTGA	435
FGBu5	FGB	T	A	G	G	cds	GE477	GAATAGTTACATTCCAAATCTTCTA	TGACTACAGGCTTTCTCTGCAT	GAATAGTTACATTCCAAATCTTCTAtaacactctgtattatatttctgcctcattccttgtagggtttcttcagtgcccgtgg[t/a]catcgaccccttgacaagaagagagaagaggctcccagcctgaggcctgccccaccgcccatcagtggaggtggctatcgggctcgtccagccaaagcagctgccactcaaaagaaagtagaaagaaaagcccctgatgctggaggctgtcttcacgctgacccagacctggtgggtgcactgatgtttcttgcagtggtggctctctcATGCAGAGAAAGCCTGTAGTCA	319
FGBu6	FGB	A	T	A	A	cds	GE330	GGGATTCAGATATTATTTTCAAAGTG	GCTTCCAACAATGAATGTTTTT	GGGATTCAGATATTATTTTCAAAGTGacattatttgctgttggttaatatatgctctttttgtttctgtcaaccaaaggatggacagtgattcagaaccgtcaagacggtagtgttgactttggcaggaaatgggatccatataaacagggatttggaaatgttgc[a/t]accaacacagatgggaagaattactgtggcctaccaggtaacgaacaggcatgcaaaataaaatcattctatttgaaatgggattttttaattaAAAAACATTCATTGTTGGAAGC	289
FGBu7	FGB	A	G	R	R	cds	GE477	GAATAGTTACATTCCAAATCTTCTA	TGACTACAGGCTTTCTCTGCAT	GAATAGTTACATTCCAAATCTTCTAtaacactctgtattatatttctgcctcattccttgtagggtttcttcagtgcccgtggtcatcg[a/g]ccccttgacaagaagagagaagaggctcccagcctgaggcctgccccaccgcccatcagtggaggtggctatcgggctcgtccagccaaagcagctgccactcaaaagaaagtagaaagaaaagcccctgatgctggaggctgtcttcacgctgacccagacctggtgggtgcactgatgtttcttgcagtggtggctctctcATGCAGAGAAAGCCTGTAGTCA	319
FGBu8	FGB	C	T	H	H	cds	GE477	GAATAGTTACATTCCAAATCTTCTA	TGACTACAGGCTTTCTCTGCAT	GAATAGTTACATTCCAAATCTTCTAtaacactctgtattatatttctgcctcattccttgtagggtttcttcagtgcccgtggtcatcgaccccttgacaagaagagagaagaggctcccagcctgaggcctgccccaccgcccatcagtggaggtggctatcgggctcgtccagccaaagcagctgccactcaaaagaaagtagaaagaaaagcccctgatgctggaggctgtcttca[c/t]gctgacccagacctggtgggtgcactgatgtttcttgcagtggtggctctctcATGCAGAGAAAGCCTGTAGTCA	319

FIG. 5PPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGBu9	FGB	C	T	Y	Y	cds	GE392	AAGGGAAGAAAGGCAGTTTT	CCCAGGAAGTGGTAGCTATTAAA	AAGGGAAGAAAGGCAGTTTTtagtttcccaaaattttattttggtgagagattttattttgttttcttttaggtgaatattggcttggaaatgataaaattagccagcttaccaggatgggacccacagaactttgatagaaatggaggactggaaaggagacaaagtaaaggctcactatggaggattcactgtacagaatgaagccaacaaataccagatctcagtgaacaaata[c/t]agaggaacagccggtaatgccctcatggatggagcatctcagctgatgggagaaaacaggaccatgaccattcacaacggcatgttcttcagcacgtatgacagagacaatgacggctggtatgtgtggcactctttgctcctgctttaaaaatcacactaatatcattactcagaatcattaacaatattTTTAATAGCTACCACTTCCTGGG	459
FGGd3	FGG	A	G	M	V	cds	GE337	TTCGTAATAGACAGCTCTTCATAGACT	GCAGTTAATTTTCTACAAATCATCC	TTCGTAATAGACAGCTCTTCATAGACTtgcagaggtaaaaagattccagaataatgatatgtacatctacgacttgttttaggtggcacttactcaaaagcatctactcctaatggttatgataatggcattatttgggccacttggaaaacccggtggtattccatgaagaaaaccact[a/g]tgaagataatcccattcaacagactcacaattggagaaggacagcaacaccacctgggggagccaaacaggtcagaccagagcaccctgcggaaacagaatatgactcactttaccctgaGGATGATTTGTAGAAAATTAACTGC	331
FGGd4	FGG	A	G	-	-	noncoding	GE349	AAAATACTTAGCAGTTTCCAAAGAAAA	TGGGTAGCCACTTTCTAAACTATTC	AAAATACTTAGCAGTTTCCAAAGAAAAtataaaattactcttctgaaaggaatacttattttgtcttcttattttgttatcttatgtttctgtttgtagatatttgcaggaaatatataattcaaataatcaaaagattgttaacctgaaagagaaggtagcccagcttgaagcacagtgccaggaaccttgcaaagacacggtgcaaatccatgatatcactgggaaaggtaactgatgaaggttatattgggattaggttcatcaaagtaagtaatgtaaaggagaaagtatgtactgg[a/g]aagtatagGAATAGTTTAGAAAGTGGCTACCCA	341
FGGd5	FGG	G	A	G	R	cds	GE360	TGCTGATGTGAAAAGTAAGAAAAT	CAAGGTGCTTAGAAAAGTATCTGC	TGCTGATGTGAAAAGTAAGAAAATtattcttggaaaatgaatagtttactacatgttaaaagctatttttcaaggctggcacagtcttacctgcatttcaaaccacagtaaaagtcgattctccttctctagattgtcaagacattgccaataagggagctaaacagagc[g/a]ggctttactttattaaacctctgaaagctaaccagcaattcttagtctactgtgaaatcgatgggtctggaaatggatggactgtgtttcagaaggtaatttttccccaccatgtgtatttaataaattcctacattgtttctgccatatgGCAGATACTTTTCTAAGCACCTTG	351
FGGd6	FGG	T	A	-	-	noncoding	GE372	GAACCAGTGCTCTGTATTTTTGAC	CCATTGTCTATTGATAGTTGGAAAG	GAACCAGTGCTCTGTATTTTTGACaaaatgttgacagcattctctttaca[t/a]gcattgatagtctatttctccttttgctcttgcaaatgtgtaattagagacttgatggcagtgtagatttcaagaaaaactggattcaatataaagaaggatttggacatctgtctcctactggcacaacagaatttggctgggaaatgagaagattcatttgataagcacacagtctgccatcccatatgcattaagagtggaactggaagactggaatggcagaaccaggtactgttttgaaatgacttccaacttttattgtaaagattgcctggaatgtgcaCTTTCCAACTATCAATAGACAATGG	369
FGGu1	FGG	A	T	Y	F	cds	GE404	CATCCTACGAAAGAGGGAACTT	TCCACTTCCAGTTTCAAAGAACT	CATCCTACGAAAGAGGGAACTTctgagatccctgaggagggtcagcatgtgatggttgtatttccttcttctcagtactgcagact[a/t]tgccatgttcaaggtgggacctgaagctgacaagtaccgcctaacatatgcctacttcgctggtggggatgctggagatgcctttgatggctttgattttggcgatgatcctagtgacaagttttcacatcccataatggcatgcagttcagtacctgggacaatgacaatgataagtttgaaggcaactgtgctgaacaggatggatctggttggtggatgaacaagtgtcacgctggccatctcaatggagtttattaccaaggtatgttttcctttcttagattccaagttaatgtatagtgtatactattttcataaaaaataataaatagatatgaagaaatgaagaataatttataaagatagtagggatttatcatgttctttatttcaactaAGTTCTTTGAAACTGGAAGTGGA	516

FIG. 5QQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FGGu2	FGG	A	C	I	I	cds	GE372	GAACCAGTGCTCTGTATTTTTGAC	CCATTGTCTATTGATAGTTGGAAAG	GAACCAGTGCTCTGTATTTTTGACaaaatgttgacagcattctctttacatgcattgatagtcta ttttctccttttgctcttgcaaatgtgtaattagagacttgatggcagtgtagatttcaagaaaa actggattcaatataaagaaggatttggacatctgtctcctactggcacaacagaatttggctg ggaaatgagaagattcatttgat[a/c]agcacacagtctgccatcccatatgcattaagagtgg aactggaagactggaatggcagaaccaggtactgttttgaaatgacttccaactttttattgtaa agattgcctggaatgtgcaCTTTCCAACTATCAATAGACAATGG	369
FSHRu1	FSHR	A	G	T	A	cds	GE667	GCTCTGAGCTTCATCCAA	AGCAAAAATCCAGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctatttaaggcaagaagttgattatatgactcag [a/g]ctaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttg acatgacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccct aagccagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatg gtttatcagcatcctggccatcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu2	FSHR	G	A	S	N	cds	GE648	GCCATGCTGCCAGTGTC	TGTTTTAGTTTTGGGCTAAAT	GCCATGCTGCCAGTGTCatggtgatgggctggattttgcttttgcagctgccctctttcccatc tttggcatcagcagctacatgaaggtgagcatctgcctgcccatggatattgacagccctttgtc acagctgtatgtcatgtccctccttgtgctcaatgtcctggcctttgtggtcatctgtggctgct atatccacatctacctcacagtgcggaaccccaacatcgtgtcctcctctagtgacaccaggatc gccaagcgcatggccatgctcatcttcactgacttcctctgcatggcacccatttctttctttgc catttctgcctccctcaaggtgcccctcatcactgtgtccaaagcaaagattctgctggttctgt ttcaccccatcaactcctgtgccaaccccttcctctatgccatctttaccaaaaactttcgcaga gatttcttcattctgctgagcaagtgtggctgctatgaaatgcaagcccaaatttataggacaga aacttcatccactgtccacaacacccatccaaggaatggccactgctcttcagctcccagagtca cca[g/a]tggttccacttacatacttgtccctctaagtcATTTAGCCCAAAACTAAAACA	646
FSHRu3	FSHR	C	G	S	R	cds	GE648	GCCATGCTGCCAGTGTC	TGTTTTAGTTTTGGGCTAAAT	GCCATGCTGCCAGTGTCatggtgatgggctggattttgcttttgcagctgccctctttcccatc tttggcatcagcagctacatgaaggtgagcatctgcctgcccatggatattgacag[c/g]cctt tgtcacagctgtatgtcatgtccctccttgtgctcaatgtcctggcctttgtggtcatctgtggc tgctatatccacatctacctcacagtgcggaaccccaacatcgtgtcctcctctagtgacaccag gatcgccaagcgcatggccatgctcatcttcactgacttcctctgcatggcacccatttctttct ttgccatttctgcctccctcaaggtgcccctcatcactgtgtccaaagcaaagattctgctggtt ctgtttcaccccatcaactcctgtgccaaccccttcctctatgccatctttaccaaaaactttcg cagagatttcttcattctgctgagcaagtgtggctgctatgaaatgcaagcccaaatttatagga cagaaacttcatccactgtccacaacacccatccaaggaatggccactgctcttcagctcccaga gtcaccagtggttccacttacatacttgtccctctaagtcATTTAGCCCAAAACTAAAACA	646

FIG. 5RRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FSHRu4	FSHR	T	G	F	V	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagagga[t/g]ttg acatgacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccct aagccagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatg gtttatcagcatcctggccatcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu5	FSHR	G	A	T	T	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttgacat gac[g/a]tacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccct aagccagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatg gtttatcagcatcctggccatcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu6	FSHR	A	C	I	L	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttgacat gacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccctaagc cagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatggttt atcagcatcctggcc[a/c]tcactgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHRu7	FSHR	A	G	T	A	cds	GE667	GCTCTGAGCTT CATCCAA	AGCAAAAATCC AGCCCATCA	GCTCTGAGCTTCATCCAAtttgcaacaaatctattttaaggcaagaagttgattatatgactcag actaggggtcagagatcctctctggcagaagacaatgagtccagctacagcagaggatttgacat gacgtacactgagtttgactatgacttatgcaatgaagtggttgacgtgacctgctcccctaagc cagatgcattcaacccatgtgaagatatcatggggtacaacatcctcagagtcctgatatggttt atcagcatcctggccatc[a/g]ctgggaacatcatagtgctagtgatcctaactaccagccaat ataaactcacagtccccaggttccttatgtgcaacctggcctttgctgatctctgcattggaatc tacctgctgctcattgcatcagttgatatccataccaagagccaatatcacaactatgccattga ctggcaaactggggcaggctgtgatgctgctggctttttcactgtctttgccagtgagctgtcag tctacactctgacagctatcaccttggaaagatggcataccatcacgcatgccatgcagctggac tgcaaggtgcagctccgccatgctgccagtgtcatggTGATGGGCTGGATTTTTGCT	642
FSHu1	FSH	T	C	Y	Y	cds	GE611	GGAACTTCCAC AATACCATAAC CTA	TTATTCTTTCA TTTCACCAAAG G	GGAACTTCCACAATACCATAACCTAactctcttcttaaactcctcaggatctggtgtataaggac ccagccaggcccaaaatccagaaaacatgtaccttcaaggaactggtata[t/c]gaaacagtga gagtgcccggctgtgctcaccatgcagattccttgtatacatacccagtggccacccagtgtcac tgtggcaagtgtgacagcgacagcactgattgtactgtgcgaggcctggggcccagctactgctC CTTTGGTGAAATGAAAGAATAA	642

FIG. 5SSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
FSHu2	FSH	G	T	S	I	cds	GE561	TTTCTCAGTTTCTAGTGGGCTTC	GGTACCTACCCTGGTGTAGCA	TTTCTCAGTTTCTAGTGGGCTTCattgtttgcttcccagaccaggatgaagacactccagttttcttcctttctgttgctggaaagcaatctgctgcaata[g/t]ctgtgagctgaccaacatcaccattgcaatagagaaagaagaatgtcgtttctgcataagcatcaacaccacttggtgtgctggctacTGCTACACCAGGGTAGGTACC	217
GABRB1 a7	GABRB 1	A	G	-	-	noncoding	GE1089	CAGATGGTATTCAAAATGATTTCCTA	AACCATCTTCTTCCTTTCACAG	CAGATGGTATTCAAAATGATTTCCTAaactttgtttaaccgtgctgttttattggtttcagatggctataccactgatgacattgaattttactggaatggaggagaaggggcagtcactggtgttaataaaatcgaacttcctcaattttcaattgttgactacaagatggtgtctaagaaggtggagttcacaacaggtgaggttgtttcccccaa[a/g]atgtactaggggtgCTGTGAAAGGAAGAAGATGGTT	260
GABRB1 a8	GABRB 1	C	A	I	I	cds	GE1271	AACATGATTTGGGGCTAGGA	TGCTAATTAACTCAGTGAGAAGTTGAAT	AACATGATTTGGGGCTAGGAagcctggaaatgaaatgtcatcactttttgtaatgtttttcttttttctctcctctctatcagaatcacaaccacagctgcatgtatgatggatcttcgaagatatccactggatgagcagaactgcaccctggagat[c/a]gaaagttgtgagttacttggacaggggaatgaaaaagagggattcttctttgacccagttgaATTCAACTTCTCACTGAGTTAATTAGCA	253
GABRB1 d3	GABRB 1	G	A	-	-	noncoding	GE1035	CCAGCCTGCTGTCACTGAG	GTCCATTTCCCATCTGCGTA	CCAGCCTGCTGTCACTGAGagaatctgttcctaatgtggcccacctcccc[g/a]gcagggccccccgtcgacgttgggatgcggatcgatgtcgccagcatagacatggtctccgaagtgaatatggtgagtggcctcccgaggggcccggcggttcggctTACGCAGATGGGAAATGGAC	182
GABRB1 d4	GABRB 1	C	T	I	I	cds	GE1089	CAGATGGTATTCAAAATGATTTCCTA	AACCATCTTCTTCCTTTCACAG	CAGATGGTATTCAAAATGATTTCCTAaactttgtttaaccgtgctgttttattggtttcagatggctataccactgatgacattgaattttactggaatggaggagaaggggcagtcactggtgttaataaaat[c/t]gaacttcctcaattttcaattgttgactacaagatggtgtctaagaaggtggagttcacaacaggtgaggttgtttcccccaaaatgtactaggggtgCTGTGAAAGGAAGAAGATGGTT	260
GABRB1 d5	GABRB 1	A	G	-	-	noncoding	GE1134	CCTCTCAATCTTGAAAAAGGA	GAGAGCCCGAGGCATCAT	CCTCTCAATCTTGAAAAAGGAacttaatagtggc[a/g]ccttcagctaagtgttgtctttctctttcacaggaatcacgacggtgcttacaatgacaaccatcagcacccacctcagggagaccctgccaaagatcccttatgtcaaagcgattgatatttatctgatgggttgctttgtgtttgtgttcctggctctgctggagtatgcctttgtaaattacatcttctttgggaaaggccctcagaaaaagggagctagcaaacaagaccagagtgccaatgagaagaataaactggagatgaataaagtccaggtaagatattaaatattcctaacaatattcttgttaaatttatcagcatcATGATGCCTCGGGCTCTC	385
GABRB1 d6	GABRB 1	G	A	L	L	cds	GE1144	TGAAAACAGGCAAAGGTCC	TGGGGACCTGTAAGGTTAAAAA	TGAAAACAGGCAAAGGTCCtgcaacttgtgtccgagcctgttcttttgccatcaggtcgacgcccacggtaacattctcctcagcaccctggaaatccggaatgagacgagtggctcggaagtgctcacgagcgtgagcgaccccaaggccaccatgtactcctatgacagcgccagcatccagtaccgcaagccccctgagcagccgcgaggcctacgggcgcgccctggaccggcacggggtacccagcaaggggcgcatccgcaggcgtgcctcccagctcaaagtcaagatccccgactt[g/a]actgatgtgaattccatagacaagtggtcccgaatgtttttccccatcaccttttctctttttaatgtcgtctattggctttactatgtacactgaggtctgttctaatggttccatttagactactttcctcttctattgtTTTTTAACCTTACAGGTCCCCA	473
GABRB1 u1	GABRB 1	G	A	T	T	cds	GE1134	CCTCTCAATCTTGAAAAAGGA	GAGAGCCCGAGGCATCAT	CCTCTCAATCTTGAAAAAGGAacttaatagtggcaccttcagctaagtgttgtctttctctttcacaggaatcacgac[g/a]gtgcttacaatgacaaccatcagcacccacctcagggagaccctgccaaagatcccttatgtcaaagcgattgatatttatctgatgggttgctttgtgtttgtgttcctggctctgctggagtatgcctttgtaaattacatcttctttgggaaaggccctcagaaaaagggagctagcaaacaagaccagagtgccaatgagaagaataaactggagatgaataaagtccaggtaagatattaaatattcctaacaatattcttgttaaatttatcagcatcATGATGCCTCGGGCTCTC	385

FIG. 5TTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GABRB1u2	GABRB1	C	T	A	A	cds	GE1134	CCTCTCAATCTTGAAAAAGGA	GAGAGCCCGAGGCATCAT	CCTCTCAATCTTGAAAAAGGAacttaatagtggcaccttcagctaagtgttgtctttctctttca caggaatcacgacggtgcttacaatgacaaccatcagcacccacctcagggagaccctgccaaag atcccttatgtcaaagcgattgatatttatctgatgggttgctttgtgtttgtgttcctggctct gctggagtatgc[c/t]tttgtaaattacatcttctttgggaaaggccctcagaaaaagggagct agcaaacaagaccagagtgccaatgagaagaataaactggagatgaataaaytccaggtaagata ttaaatattcctaacaatattcttgttaaatttatcagcatcATGATGCCTCGGGCTCTC	385
GAP43d3	GAP43	G	A	V	I	cds	GE1166	TCATTGAAGCCCTCTCTTT	TTCCCCATCCACCCATT	TCATTGAAGCCCTCTCTTTttttctcgacaaaggttgaaaaaaatgatgacgaccaaaagattg aacaagatggtatcaaaccagaagataaagctcataaggccgcaaccaaaattcaggctagcttc cgtggacacataacaaggaaaaagctcaaaggagagaagaaggatgat[g/a]tccaagctgctg aggctgaagctaataagaaggatgaagcccctgttgccgatggggtggagaagaagggagaaggc accactactgccgaagcagccccagccactggctccaagcctgatgagcccggcaaagcaggaga aactccttccgaggagaagaagggggagggtgatgctgccacagagcaggcagccccccaggctc ctgcatcctcagaggagaaggccggctcagctgagacagaaagtgccactaaagcttccactgat aactcgccgtcctccaaggctgaagatgccccagccaaggaggagcctaaacaagccgatgtgcc tgctgctgtcactgctgctgctgccaccacccctgccgcagaggatgctgctgccaaggcaacag cccagcctccaacggagactggggagagcagccaagctgaagagaacataggtgagcaaccgcga gggtcagatgcAATGGGTGGATGGGGAA	678
GAP43u1	GAP43	T	A	R	R	cds	GE1166	TCATTGAAGCCCTCTCTTT	TTCCCCATCCACCCATT	TCATTGAAGCCCTCTCTTTttttctcgacaaaggttgaaaaaaatgatgacgaccaaaagattg aacaagatggtatcaaaccagaagataaagctcataaggccgcaaccaaaattcaggctagcttc cg[t/a]ggacacataacaaggaaaaagctcaaaggagagaagaaggatgatgtccaagctgctg aggctgaagctaataagaaggatgaagcccctgttgccgatggggtggagaagaagggagaaggc accactactgccgaagcagccccagccactggctccaagcctgatgagcccggcaaagcaggaga aactccttccgaggagaagaagggggagggtgatgctgccacagagcaggcagccccccaggctc ctgcatcctcagaggagaaggccggctcagctgagacagaaagtgccactaaagcttccactgat aactcgccgtcctccaaggctgaagatgccccagccaaggaggagcctaaacaagccgatgtgcc tgctgctgtcactgctgctgctgccaccacccctgccgcagaggatgctgctgccaaggcaacag cccagcctccaacggagactggggagagcagccaagctgaagagaacataggtgagcaaccgcga gggtcagatgcAATGGGTGGATGGGGAA	678
GAP43u2	GAP43	G	A	E	E	cds	GE1166	TCATTGAAGCCCTCTCTTT	TTCCCCATCCACCCATT	TCATTGAAGCCCTCTCTTTttttctcgacaaaggttgaaaaaaatgatgacgaccaaaagattg aacaagatggtatcaaaccagaagataaagctcataaggccgcaaccaaaattcaggctagcttc cgtggacacataacaaggaaaaagctcaaaggagagaagaaggatgatgtccaagctgctgaggc tgaagctaataagaaggatgaagcccctgttgccgatggggtggagaagaagggagaaggcacca ctactgccgaagcagccccagccactggctccaagcctgatgagcccggcaaagcaggagaaact ccttccgaggagaagaagggggagggtgatgctgccacagagcaggcagccccccaggctcctgc atcctcagaggagaaggccggctcagctgagacagaaagtgccactaaagcttccactgataact cgccgtcctccaaggctgaagatgccccagccaaggagga[g/a]cctaaacaagccgatgtgcc tgctgctgtcactgctgctgctgccaccacccctgccgcagaggatgctgctgccaaggcaacag cccagcctccaacggagactggggagagcagccaagctgaagagaacataggtgagcaaccgcga gggtcagatgcAATGGGTGGATGGGGAA	678
GH1d7	GH1	G	T	-	-	noncoding	GE609	GGGGGAGACCTGTAGTCAG	GTCAGTGGGGCTCCAAGATT	GGGGGAGACCTGTAGTCAGagcccccgggcagcacaggccaatgcccgtccttcccctgcagaac ctagagctgctccgcatctccctgctgctcatccagtcgtggctggagcccgtgcagttcctcag gagtgtcttcgccaacagcctggtgtacggcgcctctgacagcaacgtctatgacctcctaaagg acctagaggaaggcatccaaacgctgatgggggtgggggtggcgctaggg[g/t]tccccAATCT TGGAGCCCCACTGAC	275

FIG. 5UUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GH1u1	GH1	G	A	-	-	noncoding	GE527	AAGGGGCCAGGGTATAAAAA	TCTCCCCTCAGGACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagacc[g/a]gctcaaggatcccaaggcccaactccccgaaccactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgcccctaaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u2	GH1	A	C	-	-	noncoding	GE527	AAGGGGCCAGGGTATAAAAA	TCTCCCCTCAGGACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctcaaggatcccaaggcccaactccccg[a/c]accactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgcccctaaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u3	GH1	T	G	-	-	noncoding	GE527	AAGGGGCCAGGGTATAAAAA	TCTCCCCTCAGGACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctcaaggatcccaaggcccaactccccgaaccactcagggtcctgtggacagctcacctagc[t/g]gcaatggctacaggtaagcgcccctaaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u4	GH1	C	G	S	C	cds	GE609	GGGGGAGACCTGTAGTCAG	GTCAGTGGGGCTCCAAGATT	GGGGGAGACCTGTAGTCAGagcccccgggcagcacaggccaatgcccgtccttcccctgcagaacctagagctgctccgcatct[c/g]cctgctgctcatccagtcgtggctggagcccgtgcagttcctcaggagtgtcttcgccaacagcctggtgtacggcgcctctgacagcaacgtctatgacctcctaaaggacctagaggaaggcatccaaacgctgatgggggtgggggtggcgctaggggtccccAATCTTGGAGCCCCACTGAC	275
GH1u5	GH1	A	T	-	-	noncoding	GE527	AAGGGGCCAGGGTATAAAAA	TCTCCCCTCAGGACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctc[a/t]aggatcccaaggcccaactccccgaaccactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgcccctaaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GH1u6	GH1	G	C	-	-	noncoding	GE527	AAGGGGCCAGGGTATAAAAA	TCTCCCCTCAGGACACATTG	AAGGGGCCAGGGTATAAAAAgggcccacaagagaccggctcaag[g/c]atcccaaggcccaactccccgaaccactcagggtcctgtggacagctcacctagctgcaatggctacaggtaagcgcccctaaaatccctttgggcaCAATGTGTCCTGAGGGGAGA	166
GHRa9	GHR	C	G	-	-	noncoding	GE602	GCTACAACATGATTTTTGGAACA	GCTTCCCCATTTATTTAGTCT	GCTACAACATGATTTTTGGAACAattaatctttttttaacccttcatttaggaacactcaagaatggactcaagaatggaaagaatgccctgattatgtttctgctggggaaaacagctgttactttaattcatcgtttacctccatctggataccttattgtatcaagctaactagcaatggtggtacagtggatgaaaagtgtttctctgttgatgaaataggtaaatcacaggttttgtttcatttgacatagttt[c/g]AGACTAAATAAATGGGGAAGC	287
GHRd7	GHR	G	A	R	H	cds	GE597	TTGAGTTGTTGACTCTTTGGC	TGACAAAAGCCAGGTTAGC	TTGAGTTGTTGACTCTTTGGCcaatatggcgtttatattttgtcttgaaagatggaccctatattgacaacatcagttccagtgtactcattgaaagtggataaggaatatgaagtgc[g/a]tgtgagatccaaacaacgaaactctggaaattatggcgagttcagtgaggtgctctatgtaacacttcctcagatgagccaatttacatgtgaagaaggtaaaagaaataaaagattaaaatagtaGCTAACCTGGCTTTTGTCA	269
GHRd8	GHR	C	T	-	-	noncoding	GE597	TTGAGTTGTTGACTCTTTGGC	TGACAAAAGCCAGGTTAGC	TTGAGTTGTTGACTCTTTGGC[c/t]aatatggcgtttatattttgtcttgaaagatggaccctatattgacaacatcagttccagtgtactcattgaaagtggataaggaatatgaagtgcgtgtgagatccaaacaacgaaactctggaaattatggcgagttcagtgaggtgctctatgtaacacttcctcagatgagccaatttacatgtgaagaaggtaaaagaaataaaagattaaaatagtaGCTAACCTGGCTTTTGTCA	269
GHRu1	GHR	A	G	G	G	cds	GE596	TTAAATTGTGTCTGTCTGTGTACT	GAAAGAAAAGTCAAAGTGTAAGG	TTAAATTGTGTCTGTCTGTGTACTaatgctctgttgaattgcacagtgcaaccagatccacccattgccctcaactggactttactgaacgtcagtttaactgggattcatgcagatatccaagtgagatgggaagcaccacgcaatgcagatattcagaaagg[a/g]tggatggttctggagtatgaacttcaatacaaagaagtaaatgaaactaaatggaaaatggtaagatgttgctacaCCTTACACTTTGACTTTTCTTTC	268

FIG. 5VVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GHRu2	GHR	A	C	I	L	cds	GE649	GCCCATATTCAGCTAAGCAAT	ATTGCCCCAGTCAATTCTTT	GCCCATATTCAGCTAAGCAATccaagttcactgtcaaacatcgacttttatgcccaggtgagcgacattacaccagcaggtagtgtggtcctttccccgggccaaaagaataaggcagggatgtcccaatgtgacatgcacccggaaatggtctcactctgccaagaaaacttccttatggacaatgcctacttctgtgaggcagatgccaaaaagtgc[a/c]tccctgtggctcctcacatcaaggttgaatcacacatacagccaagcttaaaccaagaggacatttacatcaccacagaaagccttaccactgctgctgggaggcctgggacaggagaacatgttccaggttctgagatgcctgtcccagactatacctccattcatatagtacagtccccacagggcctcatactcaatgcgactgccttgcccttgcctgacaaagagtttctctcatcatgtggctatgtgagcacagaccaactgaacaaaatcatgccttagcctttctttggtttcccaagagctacgtatttaatagcAAAGAATTGACTGGGGCAAT	569
GHRu3	GHR	G	A	R	H	cds	GE596	TTAAATTGTGTCTGTCTGTGTACT	GAAAGAAAAGTCAAAGTGTAAGG	TTAAATTGTGTCTGTCTGTGTACTaatgctctgttgaattgcacagtgcaaccagatccacccattgccctcaactggactttactgaacgtcagtttaactgggattcatgcagatatccaagtgagatgggaagcaccac[g/a]caatgcagatattcagaaaggatggatggttctggagtatgaacttcaatacaaagaagtaaatgaaactaaatggaaaatggtaagatgttgctacaCCTTACACTTTGACTTTTCTTTC	268
GHRu4	GHR	G	T	C	F	cds	GE1207	GCCATTCATGATAGCTATAAACC	CTCACCTGGGCATAAAAGT	GCCATTCATGATAGCTATAAACCcgaattccacagtgatgactcttgggttgaatttattgagctagatattgatgagccagatgaaaagactgaggaatcagacacagacagacttctaagcagtgaccatgagaaatcacatagtaacctaggggtgaaggatggcgactctggacgtaccagctgttgtgaacctgacattctggagactgatttcaatgccaatgacatacatgagggtacctcagaggttgctcagccacagaggttaaaggggaagcagatctcttatgccttgaccagaagaatcaaaataactcaccttatcatgatgctt[g/t]ccctgctactcagcagcccagtgttatccaagcagagaaaaacaaaccacaaccacttcctactgaaggagctgagtcaactcaccaagctgcccatattcagctaagcaatccaagttcactgtcaaacatcgACTTTTATGCCCAGGTGAG	498
GHRu5	GHR	C	A	P	T	cds	GE649	GCCCATATTCAGCTAAGCAAT	ATTGCCCCAGTCAATTCTTT	GCCCATATTCAGCTAAGCAATccaagttcactgtcaaacatcgacttttatgcccaggtgagcgacattaca[c/a]cagcaggtagtgtggtcctttccccgggccaaaagaataaggcagggatgtcccaatgtgacatgcacccggaaatggtctcactctgccaagaaaacttccttatggacaatgcctacttctgtgaggcagatgccaaaaagtgcatccctgtggctcctcacatcaaggttgaatcacacatacagccaagcttaaaccaagaggacatttacatcaccacagaaagccttaccactgctgctgggaggcctgggacaggagaacatgttccaggttctgagatgcctgtcccagactatacctccattcatatagtacagtccccacagggcctcatactcaatgcgactgccttgcccttgcctgacaaagagtttctctcatcatgtggctatgtgagcacagaccaactgaacaaaatcatgccttagcctttctttggtttcccaagagctacgtatttaatagcAAAGAATTGACTGGGGCAAT	569
GHRu6	GHR	C	A	P	T	cds	GE649	GCCCATATTCAGCTAAGCAAT	ATTGCCCCAGTCAATTCTTT	GCCCATATTCAGCTAAGCAATccaagttcactgtcaaacatcgacttttatgcccaggtgagcgacattacaccagcaggtagtgtggtcctttccccgggccaaaagaataaggcagggatgtcccaatgtgacatgcacccggaaatggtctcactctgccaagaaaacttccttatggacaatgcctacttctgtgaggcagatgccaaaaagtgcatccctgtggctcctcacatcaaggttgaatcacacatacagccaagcttaaaccaagaggacatttacatcaccacagaaagccttaccactgctgctgggagg[c/a]ctgggacaggagaacatgttccaggttctgagatgcctgtcccagactatacctccattcatatagtacagtccccacagggcctcatactcaatgcgactgccttgcccttgcctgacaaagagtttctctcatcatgtggctatgtgagcacagaccaactgaacaaaatcatgccttagcctttctttggtttcccaagagctacgtatttaatagcAAAGAATTGACTGGGGCAAT	569
GNRHRu1	GNRHR	G	C	W	S	cds	GE599	TCAACCTTGTCTGGATCTAATTT	GGGGCTATCCTGAATGTTTAATA	TCAACCTTGTCTGGATCTAATTTgattgtgcattcatgtgccttagaatgaagccaattcaaaaactcctagctggccttattctactgactt[g/c]gtgcgtggaaggctgctccagccagcactggtcctatggactgcgccctggaggaaagagagatgccgaaaatttgattgattctttccaagaggtaagtttctctcagcttcaaaataagacatagtgatttgattcaatttaactaTATTAAACATTCAGGATAGCCCC	269

FIG. 5WWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GNRHRu 2	GNRHR	C	T	F	F	cds	GE569	GGAAAACACCA TTTCATTTCT	CAAAGGCTTAT CCACCTCTA	GGAAAACACCATTTCATTTCTttatctccatctcaaagcatcacattctctttcttcagatagtc aaagaggttggtcaactggcagaaacccaacgctt[c/t]gaatgcaccacgcaccagccacgtt ctcccctccgagacctgaaaggagctctggtaagttaaagtgatcataacatgatcacagcatag agctcTAGAGGTGGATAAGCCTTTG	220
GNRHRu 3	GNRHR	A	C	-	-	noncoding	GE578	CATTAAAGGGC TTTATGTGAGG AT	TCTAAAGAAGA AAAACTCGTGC TA	CATTAAAGGGCTTTATGTGAGGATttttaaaaattaccattaaaaaaaaaaagcatagtccatt tgcagtataatttaccagcaggaaagatttcaatgtcctggaaaaattccctataaaaggaaga taggaaaacagaaaagtcacagtactcaacctacttcaagggaagattggatctttttggctct ctgcctctaaacaggtaa[a/c]aggctttgtattatttcTAGCACGAGTTTTTCTTCTTTAGA	259
GNRHRu 4	GNRHR	C	A	S	Y	cds	GE599	TCAACCTTGTC TGGATCTAATT T	GGGGCTATCCT GAATGTTTAAT A	TCAACCTTGTCTGGATCTAATTTgattgtgcattcatgtgccttagaatgaagccaattcaaaaa ctcctagctggccttattctactgacttggtgcgtggaaggctgct[c/a]cagccagcactggt cctatggactgcgccctggaggaaagagagatgccgaaatttgattgattctttccaagaggta agtttctctcagcttcaaaataagacatagtgatttgattcaatttaactaTATTAAACATTCAG GATAGCCCC	269
GNRHRu 5	GNRHR	G	T	-	-	noncoding	GE599	TCAACCTTGTC TGGATCTAATT T	GGGGCTATCCT GAATGTTTAAT A	TCAACCTTGTCTGGATCTAATTTgattgtgcattcatgtgccttagaatgaagccaattcaaaaa ctcctagctggccttattctactgacttggtgcgtggaaggctgctccagccagcactggtccta tggactgcgccctggaggaaagagagatgccgaaatttgattgattctttccaagag[g/t]ta agtttctctcagcttcaaaataagacatagtgatttgattcaatttaactaTATTAAACATTCAG GATAGCCCC	269
GP1BAd 2	GP1BA	C	T	T	M	cds	GE493	CTTCCAGGGGA TGCAGG	AAAAGCAAAAG GCAGGAGGT	CTTCCAGGGGATGCAGGgggatccactcaaggctcccttgcccacaggtcctcatgcctctcctc ctcttgctgctcctgctgccaagccccttacacccccaccccatctgtgaggtctccaaagtggc cagccacctagaagtgaactgtgacaagaggaatctgacagcgctgcctccagacctgccgaaag acacaaccatcctccacctgagtgagaacctcctgtacaccttctccctggcaaccctgatgcct tacactcgcctcactcagctgaacctagataggtgcgagctcaccaagctccaggtcgatgggac gctgccagtgctggggaccctggatctatcccacaatcagctgcaaagcctgcccttgctagggc agacactgcctgctctcaccgtcctggacgtctccttcaaccggctgacctcgctgcctcttggt gccctgcgtggtcttggcgaactccaagagctctacctgaaaggcaatgagctgaagaccctgcc cccagggctcctga[c/t]gcccacacccaagctggagaagctcagtctggctaacaacaacttg actgagctccccgctgggctcctgaatgggctggagaatctcgacacccttctcctccaagagaa ctcgctgtatacaataccaaagggctttttgggtcccACCTCCTGCCTTTTGCTTTT	708
GP1BAd 3	GP1BA	C	T	N	N	cds	GE495	GACACCCTTCT CCTCCAAGA	GATTGGGGTGG GCTCCG	GACACCCTTCTCCTCCAAGAgaactcgctgtatacaataccaaagggctttttgggtcccacct cctgccttttgcttttctccacgggaacccctggttatgcaactgtgagatcctctatttcgtc gctggctgcaggacaatgctgaaaatgtctacgtatggaagcaaggtgtggacgtcaaggccatg acctctaa[c/t]gtggccagtgtgcagtgtgacaattcagacaagtttcccgtctacaaatacc caggaaaggggtgccccacccttggtgatgaaggtgacacagacctatatgattactacccagaa gaggacactgagggcgataaggtgcgtgccacaaggactgtggtcaagttccccaccaaagccca tacaacccccctggggtctattctactcatggtccactgcttctctagacagccaaatgccctcct ccttgcatccaacacaagaatccactaaggagcagaccacattcccacctagatggaccccaaat ttcacacttcacatggaatccatcacattctccaaaactccaaaatccactactgaaccaacccc aagcccgaccacctcagagcccgtcccggagcccgccccaaacatgaccaccctggagcccactc caagcccgaccaccccagagcccacctcagagcccgcccccagcccgaccacccCGGAGCCCACC CCAATC	721

FIG. 5XXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GP1BAd 4	GP1BA	A	G	R	R	cds	GE495	GACACCCTTCT CCTCCAAGA	GATTGGGGTGG GCTCCG	GACACCCTTCTCCTCCAAGAgaactcgctgtatacaataccaaagggctttttgggtcccacct cctgccttttgcttttctccacgggaacccctggttatgcaactgtgagatcctctattttcgtc gctggctgcaggacaatgctgaaaatgtctacgtatggaagcaaggtgtggacgtcaaggccatg acctctaacgtggccagtgtgcagtgtgacaattcagacaagtttcccgtctacaaatacccagg aaaggggtgccccacccttggtgatgaaggtgacacagacctatatgattactacccagaagagg acactgagggcgataaggtgcgtgccacaaggactgtggtcaagttccccaccaaagcccataca accccctggggtctattctactcatggtccactgcttctctagacagccaaatgccctcctcctt gcatccaacacaagaatccactaaggagcagaccacattcccacctag[a/g]tggaccccaaat ttcacacttcacatggaatccatcacattctccaaaactccaaaatccactactgaaccaacccc aagcccgaccacctcagagcccgtcccggagcccgccccaaacatgaccaccctggagcccactc caagcccgaccaccccagagcccacctcagagcccgcccccagcccgaccacccCGGAGCCCACC CCAATC	721
GP1BAu 1	GP1BA	G	A	R	H	cds	GE493	CTTCCAGGGGA TGCAGG	AAAAGCAAAAG GCAGGAGGT	CTTCCAGGGGATGCAGGggatccactcaaggctcccttgcccacaggtcctcatgcctctcctc ctcttgctgctcctgctgccaagccccttacaccccaccccatctgtgaggtctccaaagtggc cagccacctagaagtgaactgtgacaagaggaatctgacagcgctgcctccagacctgccgaaag acacaaccatcctccacctgagtgagaacctcctgtacaccttctccctggcaaccctgatgcct tacactc[g/a]cctcactcagctgaacctagataggtgcgagctcaccaagctccaggtcgatg ggacgctgccagtgctggggaccctggatctatcccacaatcagctgcaaagcctgcccttgcta gggcagacactgcctgctctcaccgtcctggacgtctccttcaaccggctgacctcgctgcctct tggtgccctgcgtggtcttggcgaactccaagagctctacctgaaaggcaatgagctgaagaccc tgcccccagggctcctgacgcccacacccaagctggagaagctcagtctggctaacaacaacttg actgagctccccgctgggctcctgaatgggctggagaatctcgacacccttctcctccaagagaa ctcgctgtatacaataccaaagggctttttgggtcccACCTCCTGCCTTTTGCTTTT	708
GP5d1	GP5	C	T	P	P	cds	GE908	AGTACAGGCGC GAACGCT	AACCCCTTGGG CAGGTG	AGTACAGGCGCGAACGCTcctgtgtgttgaccacactcccacggttgcttttcagacatgctga gggggactctactgtgcgcggtgctcgggcttctgcgcgcccagcccttcccctgtccgccagct tgcaagtgtgtcttccgggacgccgcgcagtgctcgggggcgacgtggcgcgcatctccgcgct gggcctgcccaccaacctcacgcacatcctgctcttcggaatgggccgcggcgtcctgcagagcc agagcttcagcggcatgaccgtcctgcagcgcctcatgatctccgacagccacatttccgccgtt gcccc[c/t]ggcaccttcagtgacctgataaaactgaaaaccctgaggctgtcgcgcaacaaaa tcacgcatcttccaggtgcgctgctggataagatggtgctcctggagcagttgtttttggaccac aatgcgctaaggggcattgaccaaaacatgtttcagaaactggttaacctgcaggagctcgctct gaaccagaatcagctcgatttccttcctgccagtctcttcacgaatctggagaacctgaagttgt tggatttatcgggaaacaacctgaccCACCTGCCCAAGGGGTT	628
GP5d2	GP5	G	A	Q	Q	cds	GE908	AGTACAGGCGC GAACGCT	AACCCCTTGGG CAGGTG	AGTACAGGCGCGAACGCTcctgtgtgttgaccacactcccacggttgcttttcagacatgctga gggggactctactgtgcgcggtgctcgggcttctgcgcgcccagcccttcccctgtccgccagct tgcaagtgtgtcttccgggacgccgcgcagtgctcgggggcgacgtggcgcgcatctccgcgct gggcctgcccaccaacctcacgcacatcctgctcttcggaatgggccgcggcgtcctgcagagcc agagcttcagcggcatgaccgtcctgcagcgcctcatgatctccgacagccacatttccgccgtt gcccccggcaccttcagtgacctgataaaactgaaaaccctgaggctgtcgcgcaacaaaatcac gcatcttccaggtgcgctgctggataagatggtgctcctggagcagttgtttttggaccacaatg cgctaaggggcattgaccaaaacatgtttcagaaactggttaacctgca[g/a]gagctcgctct gaaccagaatcagctcgatttccttcctgccagtctcttcacgaatctggagaacctgaagttgt tggatttatcgggaaacaacctgaccCACCTGCCCAAGGGGTT	628

FIG. 5YYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GP5d3	GP5	G	A	L	L	cds	GE908	AGTACAGGCGCGAACGCT	AACCCCTTGGGCAGGTG	AGTACAGGCGCGAACGCTcctgtgtgttgaccacactcccacggttgcttttcagacatgctgaggggactctactgtgcgcggtgctcgggcttctgcgcgcccagcccttcccctgtccgccagcttgcaagtgtgtcttccgggacgccgcgcagtgctcggggggcgacgtggcgcgcatctccgcgct[g/a]ggcctgcccaccaacctcacgcacatcctgctcttcggaatgggccgcggcgtcctgcagagccagagcttcagcggcatgaccgtcctgcagcgcctcatgatctccgacagccacatttccgccgttgcccccggcaccttcagtgacctgataaaactgaaaaccctgaggctgtcgcgcaacaaaatcacgcatcttccaggtgcgctgctggataagatggtgctcctggagcagttgttttggaccacaatgcgctaaggggcattgaccaaaacatgtttcagaaactggttaacctgcaggagctcgctctgaaccagaatcagctcgatttccttcctgccagtctcttcacgaatctggagaacctgaagttgttggatttatcgggaaacaacctgaccCACCTGCCCAAGGGGTT	628
GP9u1	GP9	G	A	T	T	cds	GE401	CTACATCCCCAGTGCTTGC	TCTGGTGGTTTGGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccccctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagcagaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtgggtggactgcaggggccacggactcac[g/a]gccctgcctgccctgccggcccgcacccgccaccttctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgcagaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcctctggctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgcccatggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcctgggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctcttctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctccagccagggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCACCAGA	719
GP9u2	GP9	C	G	L	L	cds	GE401	CTACATCCCCAGTGCTTGC	TCTGGTGGTTTGGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccccctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagcagaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtgggtggactgcaggggccacggactcacggccctgcctgccctgccggcccgcacccgccaccttctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgcagaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcct[c/g]tggctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgcccatggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcctgggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctcttctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctccagccagggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCACCAGA	719
GP9u3	GP9	T	A	W	R	cds	GE401	CTACATCCCCAGTGCTTGC	TCTGGTGGTTTGGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagccccctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctc[t/a]gggccacagcagaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtgggtggactgcaggggccacggactcacggccctgcctgccctgccggcccgcacccgccaccttctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgcagaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcctctggctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgcccatggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcctgggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctcttctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctccagccagggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCACCAGA	719

FIG. 5ZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GP9u4	GP9	G	A	A	T	cds	GE401	CTACATCCCCAGTGCTTGC	TCTGGTGGTTTGGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagcccctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagcagaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtgggtggactgcaggggccacggactcacg[g/a]ccctgcctgccctgccggcccgcacccgccaccttctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgcagaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcctctggctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgcccatggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcctgggtgcgcccgggggtcttgtgggacgtggcgctggtcgccgtggccgcgctgggcctggctcttctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctccagccagggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCACCAGA	719
GP9u5	GP9	G	A	A	T	cds	GE401	CTACATCCCCAGTGCTTGC	TCTGGTGGTTTGGGCTGAC	CTACATCCCCAGTGCTTGCcgtccctgaggatcggtccaggctgccaggccctccctcacagcccctctctctgcagccagcctgtcccatgcctgcctggggagccctgttcctgctctgggccacagcagaggccaccaaggactgccccagcccatgtacctgccgcgccctggaaaccatggggctgtgggtggactgcaggggccacggactcacggccctgcctgccctgccggcccgcacccgccaccttctgctggccaacaacagccttcagtccgtgcccccgggagcctttgaccacctgccccagctgcagaccctcgatgtgacgcagaacccctggcactgtgactgcagcctcacctatctgcgcctctggctggaggaccgcacgcccgaggccctgctgcaggtccgctgtgccagccccagcctcgctgcccatggcccgctgggccggctgacaggctaccagctgggcagctgtggctggcagctgcaggcgtcctgggtgcgcccgggggtcttgtgggacgtggcgctggtc[g/a]ccgtggccgcgctgggcctggctcttctggctggcctgctgtgtgccaccacagaggccctggattgagccaggcccccagaacctggctccagccagggggccagtccctgaggcaggtccccagactccaccaagcctgGTCAGCCCAAACCACCAGA	719
GRFu1	GRF	C	T	L	F	cds	GE510	AACCACACAGAGAGAGCAAC	ACACCCATACCTGTGCTT	AACCACACAGAGAGAGCAACcaagagcgaggagcaagggcacgg[c/t]ttggtcgtcaggtagacagcatgtgggcagaacaaaagcaaatggaattggagagcatcctggtggccctgctgcagAAGCACAGGTATGGGTGT	144
GRIN1u1	GRIN1	T	A	I	N	cds	GE1121	AGTGCTGGGCCTTGGCG	GAGTGACCCCGCCCACC	AGTGCTGGGCCTTGGCGgggtccccgaacggggaggaccccacgggctctgagtcgcatgctcgcctaggca[t/a]cctcgggctgcagctcatcaacggcaagaacgagtcggcccacatcagcgacgccgtgggcgtggtggcccaggccgtgcacgagctcctcgagaaggagaacatcaccgacccgccgcggggctgcgtgggcaacaccaacatctggaagaccggccgctcttcaagaggtgggcggggcctccccggagctgggcggggctgctcttggggaGGTGGCGGGGTCACTC	309
GRIN1u2	GRIN1	G	C	D	H	cds	GE1293	CCCCCGCAGACAGACAG	CCTTCCCGAGCAGCAGG	CCCCCGCAGACAGACAGacagacggatgggacagcggcccggcccacgcagagccccggagcaccacggggtcgggggaggagcacccccagcctcccccaggctgcgcctgcccgcccgccggttggccggctggccggtccaccccgtcccggccccgcgcgtgcccccagcgtggggctaacgggcgccttgtctgtgtatttctattttgcagcagtaccatcccactgatatcacgggcccgctcaacctctca[g/c]atccctcggtcagcaccgtggtgtgaggcccccggaggcgcccacctgcccagttagcccggccaaggacactgatgggtCCTGCTGCTCGGGAAGG	361
GRIN1u3	GRIN1	A	G	P	P	cds	GE1085	GAGGACCTGGGCCTGCG	AGCCCGTGGGGTCCTCC	GAGGACCTGGGCCTGCGgagcgccgcggtgggagtgctggagtcctggcccgtcatccccgtctgccccacagcgaggacgatgctgccactgtataccgcgcagccgcgatgctgaacatgacgggctccgggtacgtgtggctggtcggcgagcgcgagatctcggggaacgccctgcgctacgcccc[a/g]gacggtgagtgctgggccttggcggggtccccgaacggGGAGGACCCCACGGGCT	250

FIG. 5AAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRIN1u 4	GRIN1	G	C	E	Q	cds	GE1287	GAGCTGAGAAGAGACTGCCG	GTAGGTGCGGGCGGTAACT	GAGCTGAGAAGAGACTGCCGccctgggcagccttaggtcggtggtccaggctgggtctcccttccccccagattgtgacgatccaccag[g/c]agcccttcgtgtacgtcaagcccacgctgagtgatgggacatgcaaggaggagttcacagtcaacggcgacccagtcaagaaggtgatctgcaccgggcccaacgacacgtcgccgggcagccgtgagtgcgcggggcagggcgcggggcgcggggcagggcgcggggcgtggggcggtctggagcccagcAGTTACCGCCCGCACCTAC	306
GRIN1u 5	GRIN1	T	G	C	G	cds	GE1287	GAGCTGAGAAGAGACTGCCG	GTAGGTGCGGGCGGTAACT	GAGCTGAGAAGAGACTGCCGccctgggcagccttaggtcggtggtccaggctgggtctcccttccccccagattgtgacgatccaccaggagcccttcgtgtacgtcaagcccacgctgagtgatgggaca[t/g]gcaaggaggagttcacagtcaacggcgacccagtcaagaaggtgatctgcaccgggcccaacgacacgtcgccgggcagccgtgagtgcgcggggcagggcgcggggcgcggggcagggcgcggggcgtggggcggtctggagcccagcAGTTACCGCCCGCACCTAC	306
GRIN1u 6	GRIN1	G	C	D	H	cds	GE1287	GAGCTGAGAAGAGACTGCCG	GTAGGTGCGGGCGGTAACT	GAGCTGAGAAGAGACTGCCGccctgggcagccttaggtcggtggtccaggctgggtctcccttccccccagattgtgacgatccaccaggagcccttcgtgtacgtcaagcccacgctgagtgatgggacatgcaaggaggagttcacagtcaacggcgacccagtcaagaaggtgatctgcaccgggcccaac[g/c]acacgtcgccgggcagccgtgagtgcgcggggcagggcgcggggcgcggggcagggcgcggggcgtggggcggtctggagcccagcAGTTACCGCCCGCACCTAC	306
GRIN1u 7	GRIN1	G	A	K	K	cds	GE1115	GCGGGAGCTGGGAGGAC	AGGGACGCGAGGTCAGC	GCGGGAGCTGGGAGGACgctgcctgcatgcccgccggctctgtcgcctcgcaggtgaacaacagcaacaagaaggagtggaatgggatgatgggcgagctgctcagcgggcaggcagacatgatcgtggcgccgctaaccataaacaacgagcgcgcgcagtacatcgagtttccaagcccttcaagtaccagggcctgactattctggtcaa[g/a]aaggtgggcaggggccgggtggcggggtggcggcggggggagtccctggagggcccgggccgcGCTGACCTCGCGTCCCT	299
GRIN1u 8	GRIN1	G	A	E	E	cds	GE1120	TTCCGGCAGTGGGAGGC	CGTCCTGCACCTCGGCT	TTCCGGCAGTGGGAGGCgggtgggagggcgggtccccgcgggtccacctcagcccaccgtgcccccgcctcccgcagagcatccacctgagcttcctgcgcaccgtgccgccctactcccaccagtccagcgtgtggtttgagatgatgcgtgtctacagctggaaccacatcatcctgctggtcagcgacgaccacga[g/a]ggccgggcggctcagaaacgcctggagacgctgctggaggagcgtgagtccaaggtgagggtcggcgccgcgggtgggcgcctggcggAGCCGAGGTGCAGGACG	309
GRLd17	GRL	G	T	-	-	noncoding	GE1196	ATTCAAGGTGGCCAAATTAT	AAAGAAAACAAAAACATGTCC	ATTCAAGGTGGCCAAATTATttgtgtaatagaaaactgaaaatctaatattaaaaatatggaacttctaatatattttttatatttagttatagtttcagatatatatcatattggtattcactaatctgggaagggaagggctactgcagctttacatgcaatttattaaaatgattgtaaaatagcttgtatagtgtaaaataagaatgattttagatgagattgttttatcatgacatgttatatatttttgtagg[g/t]gtcaaagaaatgctgatggataacctatatgatttatagtttgtacatgcattcatacaggcagcgatggtctcagaaaccaaacagtttgctctaggggaagagggagatggagactggtcctgtgtgcagtgaaggttgctgaggctctgacccagtgagattacagaggaagttatcctctgcctcccattctgaccacccttctcattccaacagtgagtctgtcagcgcaggtttagtttactcaatctcccccttgcactaaagtatgtaaagtatgtaaacaggagacaggaaggtggtgcttacatccttaaaggcaccatctaatagcgggttactttcacatacagccctcccccagcagttgaatgacaacagaagcttcagaagtttggcaatagtttgcatagaggtaccagcaatatgtaaatagtgcagaatctcataggttgccaataatacactaattcctttctatcctacaacaagagtttatttccaaataaaatgaGGACATGTTTTTGTTTTCTTT	802
GRLd18	GRL	G	T	-	-	noncoding	GE628	GACCTTCCCATTACAGTTCATTTC	GAAGAAAACACAAAGGTTTATATAGTTGC	GACCTTCCCATTACAGTTCATTTCtatgtattt[g/t]tttaaatacccacagctcgaaaaacaaagaaaaaaataaaaggaattcagcaggccactacaggagtctcacaagaaacctctgaaaatcctggtaacaaaacaatagttcctgcaacgttaccacaactcacccctaccctggtgtcactgttggaggttattgaacctgaagtgttatatgcaggatatgatagctctgttccagactcaacttggaggatcatgactacgctcaacatgttaggagggcggcaagtgattgcagcagtgaaatgggcaaaggcaataccaggtaagatgcaaaacataaaagaGCAACTATATAAACCTTTGTGTTTTCTTC	383

FIG. 5BBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLd19	GRL	G	A	E	E	cds	GE666	TGTGACTTTAGAGCTTATGATGTT	GACCCAGAAGAAAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTttcccccggttttgtttttttgttttgtagttgatattcactgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcagga[g/a]aggggagatgtgatggacttctataaaccctaagaggaggagctactgtgaaggtttctgcgtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggttgattttccaaaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctcaatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagcagggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaacctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagggccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacattttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLd20	GRL	G	A	R	K	cds	GE666	TGTGACTTTAGAGCTTATGATGTT	GACCCAGAAGAAAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTttcccccggttttgtttttttgttttgtagttgatattcactgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcaggaga[g/a]gggagatgtgatggacttctataaaccctaagaggaggagctactgtgaaggtttctgcgtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggttgattttccaaaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctcaatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagcagggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaacctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagggccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacattttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLu1	GRL	T	G	F	V	cds	GE666	TGTGACTTTAGAGCTTATGATGTT	GACCCAGAAGAAAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTttcccccggttttgtttttttgttttgtagttgatattcactgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcaggagaggggagatgtgatggacttctataaaccctaagaggaggagctactgtgaaggtttctgcgtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggttgat[t/g]ttccaaaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctcaatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagcagggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaacctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagggccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacattttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLu10	GRL	A	G	-	-	noncoding	GE1196	ATTCAAGGTGGCCAAATTAT	AAAGAAAACAAAAACATGTCC	ATTCAAGGTGGCCAAATTATttgtgtaatagaaaactgaaaatctaatattaaaaatatggaacttctaatatatttttatatttagttatagtttcagatatatatcatattggtattcactaatctgggaagggaagggctactgcagctttacatgcaatttattaaaatgattgtaaaatagcttgtatagtgtaaaataagaatgattttagatgagattgttttatcatgacatgttatatatttttgtaggggtcaaagaaatgctgatggataacctatatgatttatagtttgtacatgcattcatacaggcagcgatggtctcagaaaccaaacagtttgctctaggggaagagggagatggagactggtcctgtgtgcagtgaaggttgctgaggctctgacccagtgagattacagaggaagttatcctctgcctcccattctgaccacccttctcattccaacagtgagtctgtcagcgcaggtttagtttactcaatctcccctgcactaaagtatgtaaagtatgtaaacaggagacaggaaggtggtgcttacatccttaaaggcaccatctaatagcgggttactttcacatacagccctcccccagcagttgaatgacaacagaagcttcagaagtttggcaatagtttgcatagaggtaccagcaatatgtaaatagtgcagaatctcataggttgccaataatacactaattcctttct[a/g]tcctacaacaagagtttatttccaaataaaatgaGGACATGTTTTTGTTTTCTTT	802

FIG. 5CCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu11	GRL	A	C	-	-	noncoding	GE558	AAATATGTTTGAAGACCTGTGAA	AAATGATAAATTTTTATAAGCTACAGAG	AAATATGTTTGAAGACCTGTGAAactttaatagtgccttttattccatat[a/c]ggacagcacaattacctatgtgctggaaggaatgattgcatcatcgataaaattcgaagaaaaactgcccagcatgccgctatcgaaaatgtcttcaggctggaatgaacctggaaggtaatataaatatctgaaagcaattgtttgtCTCTGTAGCTTATAAAAATTTATCATTT	232
GRLu12	GRL	C	T	H	H	cds	GE565	CTTCTGAAGAGTGTTGCCTCAT	GGGAAAATGACACACATACAACT	CTTCTGAAGAGTGTTGCCTCATacctttatttctcttaattcaggtttcaggaacttaca[c/t]ctggatgaccaaatgaccctactgcagtactcctggatgtttcttatggcatttgctctggggtggagatcatatagacaatcaagtgcaaacctgctgtgttttgctcctgatctgattattaatgagtaAGTTGTATGTGTGTCATTTTCCC	219
GRLu13	GRL	T	A	-	-	noncoding	GE1325	TGATCTGTCAAACTTCCAGAACC	TTGGCATTGCTGTAAATG	TGATCTGTCAAACTTCCAGAACCatggtagccttcagtgagatttccatcttggctggtcactccctgactgtagctgtaggtgaatgtgtttttgtgtgtgtgtgtctggttttagtgtcagaagggaaataaaagtgtaaggaggacactt[t/a]aaaccctttgggtggagtttcgtaatttcccagactattttcaagcaacctggtccacccaggattagtgaccaggttttcaggaaaggatttgcttctctctagaaaatgtctgaaaggatttttatttctgatgaaaggctgtatgaaaataccctcctcaaataacttgcttaactacatatagattcaagtgtgtcaatattctatttgtatattaaatgctatataatggggacaaatctatattatactgtgtatggcattattaagaagctttttcattatttttatcacagtaattttaaaatgtgtaaaaattaaaaccagtgactcctgtttaaaaataaaagttgtagttttttattcatgctgaataataatctgtagttaaaaaaaaagtgtcttttttacctacgcagtgaaatgtcagactgtaaaaccttgtgtggaaatgtttaactttatttttcatttaaatttgctgttctggtattaccaaaccacacatttgtaccgaattggcagtaaatgttagcCATTTACAGCAATGCCAA	718
GRLu14	GRL	G	C	D	H	cds	GE1201	CAACGGTGGCAATGTGAAA	AAGAAACAGGAAAAACACTGAT	CAACGGTGGCAATGTGAAAttgtataccacagaccaaagcacctttgacattttgcaggatttggagttttcttctgggtccccaggtaaagagacgaatgagagtccttggagatcagacctgttgatagatgaaaactgtttgctttctcctctggcgggagaagacgattcattcctttttggaaggaaactcgaatgaggactgcaagcctctcatttttaccggacactaaacccaaaattaaggataatggagatctggttttgtcaagccccagtaatgtaacactgccccaagtgaaaacagaaaaagaagatttcatcgaactctgcacccctggggtaattaagcaagagaaactgggcacagtttactgtcaggcaagctttcctggagcaaatataattggtaataaaatgtctgccatttctgttcatggtgtgagtacctctggaggacagatgtaccactatgacatgaatacagcatccctttctcaacagcag[g/c]atcagaagcctattttttaatgtcattccaccaattcccgttggttccgaaaattggaataggtgccaaggatctggagatgacaacttgacttctctggggactctgaacttccctggtcgaacagtttttttctaatggctattcaaggtaagATCAGTGTTTTTCCTGTTTCTT	688
GRLu15	GRL	C	A	-	-	noncoding	GE664	GCATTTTTGATTTATGCATGG	GAGGAATTACTTTGTCTGATTAAAA	GCATTTTTGATTTATGCATGGaaacctgaaaaaaagtttacaagtgtatatcagaaaagggaagttgtgccttttatagctattactgtctggttttaacaatttcctttatatttagtgaactacgcttgctcatttttttcttacataatttttttattcaagttattgtacagctgtttaagatgggcagctagttcgtagctttcccaaataaactctaaacattaatcaatcatctgtgtgaaaatgggttggtgcttctaacctgatggcacttagctatcagaagaccacaaaaattgactcaaatctccagtattcttgtcaaaaaaaaaaaaaaaaaagctcatattttgtatatatctgcttcagtggagaattatataggttgtgcaaattaacagtcctaa[c/a]tggtatagagcacctagtccagtgacctgctgggtaaactgtggatgatggttgcaaaagactaatttaaaaaataactaccaagaggccctgtctgtacctaacgccctatttttgcaatggctatatggcaagaaagctggtaaactatttgtctttcaggacctttttgaagtagtttgtataacttcttaaaagttgtgattccagataaccagctgtaacacagctgagagacTTTTAATCAGACAAAGTAATTCCTC	678

FIG. 5DDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu16	GRL	G	T	-	-	noncoding	GE1325	TGATCTGTCAAACTTCCAGAACC	TTGGCATTGCTGTAAATG	TGATCTGTCAAACTTCCAGAACCatggtagccttcagtgagatttccatcttggctggtcactccctgactgtagctgtaggtgaatgtgtttttgtgtgtgtgtgtctggtttagtgtcagaagggaaataaaagtgtaaggaggacactttaaaccctttgggtggagtttcgtaatttcccagactattttcaagcaacctggtccacccaggattagtgaccaggttttcaggaaaggatttgcttctctctagaaaatgtctgaaag[g/t]atttattttctgatgaaaggctgtatgaaaataccctcctcaaataacttgcttaactacatatagattcaagtgtgtcaatattctatttgtatattaaatgctatataatggggacaaatctatattatactgtgtatggcattattaagaagcttttcattatttttatcacagtaattttaaaatgtgtaaaaattaaaaccagtgactcctgtttaaaaataaaagttgtagtttttattcatgctgaataataatctgtagttaaaaaaaaagtgtcttttacctacgcagtgaaatgtcagactgtaaaaccttgtgtggaaatgtttaactttatttttcatttaaatttgctgttctggtattaccaaaccacacatttgtaccgaattggcagtaaatgttagcCATTTACAGCAATGCCAA	718
GRLu2	GRL	A	G	N	S	cds	GE1201	CAACGGTGGCAATGTGAAA	AAGAAACAGGAAAAACACTGAT	CAACGGTGGCAATGTGAAAttgtataccacagaccaaagcacctttgacattttgcaggatttggagtttcttctgggtccccaggtaaagagacgaatgagagtccttggagatcagacctgttgatagatgaaaactgtttgctttctcctctggcgggagaagacgattcattcctttggaaggaaactcgaatgaggactgcaagcctctcatttaccggacactaaacccaaaattaaggataatggagatctggttttgtcaagccccagtaatgtaacactgccccaagtgaaaacagaaaaagaagatttcatcgaactctgcaccccctggggtaattaagcaagagaaactgggcacagtttactgtcaggcaagctttcctggagcaaatataattggtaataaaatgtctgccatttctgttcatggtgtgagtacctctggaggacagatgtaccactatgacatgaatacagcatccctttctcaacagcaggatcagaagcctattttaatgtcattccaccaattcccgttggttccgaaa[a/g]ttggaataggtgccaaggatctggagatgacaacttgacttctctggggactctgaacttccctggtcgaacagtttttctaatggctattcaaggtaagATCAGTGTTTTTCCTGTTTCTT	688
GRLu3	GRL	C	T	D	D	cds	GE621	CAGTGAGACCCTATCTATCTGAAAAA	CATACTTTGTCCCAGAAAACTCTT	CAGTGAGACCCTATCTATCTGAAAAAaaaaaaaaaaagaaaagaaaagaaaaagaaaatccttaactgacttcatcttaacctttagttcctaagga[c/t]ggtctgaagagccaagagctatttgatgaaattagaatgacctacatcaaagagctaggaaaagccattgtcaagagggaaggaaactccagccagaactggcagcggtttatcaactgacaaaactcttggattctatgcatgaagtaagtgtcaaacataaagccaaatatAAGAGTTTTCTGGGACAAAGTATG	302
GRLu4	GRL	T	C	N	N	cds	GE677	GACCAATTTGGAAGCCTGAT	CACAACTTCCCTTTTCTGATATACAC	GACCAATTTGGAAGCCTGATcattaccatatcttctcttgcaggtggttgaaaatctccttaactattgcttccaaacattttggataagaccatgagtattgaattccccgagatgttagctgaaatcatcaccaatcagataccaaaatattcaaa[t/c]ggaaatatcaaaaacttctgtttcatcaaaagtgactgccttaataagaatggttgccttaaagaaagtcgaattaatagcttttattgtataaactatcagtttgtcctgtagaggttttgttgtttttatttttattgttttcatctgttgttttgttttaaatacgcactacatgtggtttatagagggccaagacttggcaacagaagcagttgagtcgtcatcactttcagtgatgggagagtagatggtgaaatttattagttaatatatcccagaattagaaaccttaatatgtggacgtaatctccacagtcaaagaaggatggcacctaaaccaccagtgcccaaagtctgtgtgatgaactttctcttcatactttttttcacagttggctggatgaaatttctagactttctgttggtgtatccccccccctgtatagttaggatagcattttgatttatgcatggaaacctgaaaaaaagtttacaaGTGTATATCAGAAAAGGGAAGTTGTG	693

FIG. 5EEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu5	GRL	T	C	-	-	noncoding	GE671	TGATTCCAGATAACCAGCTGTAAC	GCATTTCTTTGACCCCTACAA	TGATTCCAGATAACCAGCTGTAACacagctgagagactttaatcagacaaagtaatcctctca ctaaactttacccaaaaactaaatctctaatatggcaaaaatggctagacacccattttcacatt cccatctgtcaccaattggttaatctttcctgatggtacaggaaagctcagctactga[t/c]tt ttgtgatttagaactgtatgtcagacatccatgtttgtaaaactacacatccctaatgtgtgcca tagagtttaacacaagtcctgtgaatttcttcactgttgaaaattattttaaacaaaatagaagc tgtagtagccctttctgtgtgcaccttaccaactttctgtaaactcaaaacttaacatatttact aagccacaagaaatttgatttctattcaaggtggccaaattatttgtgtaatagaaaactgaaaa tctaatattaaaaatatggaacttctaatatattttatatttagttatagtttcagatatatat catattggtattcactaatctgggaagggaagggctactgcagctttacatgcaatttattaaaa tgattgtaaaatagcttgtatagtgtaaaataagaatgattttagatgagattgtttatcatg acatgttatatattttTTGTAGGGGTCAAAGAAATGC	687
GRLu6	GRL	A	G	-	-	noncoding	GE1325	TGATCTGTCAAACTTCCAGAACC	TTGGCATTGCTGTAAATG	TGATCTGTCAAACTTCCAGAACCatggtagccttcagtgagatttccatcttggctggtcactcc ctgactgtagctgtaggtgaatgtgtttttgtgtgtgtgtgtctggttttagtgtcagaagggaa ataaaagtgtaaggaggacactttaaaccctttgggtggagtttcgtaatttcccagactatttt caagcaacctggtccacccaggattagtgaccaggttttcaggaaaggatttgcttctctctaga aaatgtctgaaaggatttttatttctgatgaaaggctgtatgaaaataccctcctcaaataactt gcttaactacatatagattcaagtgtgtcaatattctatttgtatattaaatgctatataatgg ggacaaatctatattatactgtgtatggcattattaagaagcttttttcattatttttttatcacag taattttaaaatgtgtaaaaattaaaaccagtgactcctgtttaaaaataaaagttgtagttttt tattcatgctgaataataatctgtagttaaaaaaaaagtgtcttttttacctacgcagtgaaatgt cagactgtaaaaccttgtgtggaaatgtttaactttatttttttc[a/g]tttaaatttgctgtt ctggtattaccaaaccacacatttgtaccgaattggcagtaaatgttagcCATTTACAGCAATGC CAA	718
GRLu7	GRL	A	G	P	P	cds	GE666	TGTGACTTTAGAGCTTATGATGTT	GACCCAGAAGAAAACTCCAAA	TGTGACTTTAGAGCTTATGATGTTtcccccggttttttgttttttgttttgtagttgatattcac tgatggactccaaagaatcattaactcctggtagagaagaaaaccccagcagtgtgcttgctcag gagaggggagatgtgatggacttctataaaaccctaagaggaggagctactgtgaaggtttctgc gtcttcaccctcactggctgtcgcttctcaatcagactccaagcagcgaagacttttggttgatt ttcc[a/g]aaaggctcagtaagcaatgcgcagcagccagatctgtccaaagcagtttcactctc aatgggactgtatatgggagagacagaaacaaaagtgatgggaaatgacctgggattcccacagc agggccaaatcagcctttcctcgggggaaacagacttaaagcttttggaagaaagcattgcaaac ctcaataggtcgaccagtgttccagagaaccccaagagttcagcatccactgctgtgtctgctgc ccccacagagaaggagtttccaaaaactcactctgatgtatcttcagaacagcaacatttgaagg gccagactggcaccaacggtggcaatgtgaaattgtataccacagaccaaagcacctttgacatt ttgcaggaTTTGGAGTTTTCTTCTGGGTC	679
GRLu8	GRL	C	T	P	P	cds	GE1201	CAACGGTGGCAATGTGAAA	AAGAAACAGGAAAAACACTGAT	CAACGGTGGCAATGTGAAAttgtataccacagaccaaagcacctttgacattttgcaggatttgg agtttcttctgggtccccaggtaaagagacgaatgagagtccttggagatcagacctgttgata gatgaaaactgtttgctttctcctctggcgggagaagacgattcattcctttggaaggaaactc gaatgaggactgcaagcctctcatttaccggacactaaacccaaaattaaggataatggagatc tggttttgtcaagccc[c/t]agtaatgtaacactgccccaagtgaaaacagaaaaagaagattt catcgaactctgcacccctggggtaattaagcaagagaaactgggcacagtttactgtcaggcaa gctttcctggagcaaatataattggtaataaaatgtctgccatttctgttcatggtgtgagtacc tctggaggacagatgtaccactatgacatgaatacagcatccctttctcaacagcaggatcagaa gcctattttaatgtcattccaccaattcccgttggttccgaaaattggaataggtgccaaggat ctggagatgacaacttgacttctctggggactctgaacttccctggtcgaacagtttttctaat ggctattcaaggtaagATCAGTGTTTTTCCTGTTTCTT	688

FIG. 5FFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
GRLu9	GRL	G	A	-	-	noncoding	GE664	GCATTTTTGATTTATGCATGG	GAGGAATTACTTTGTCTGATTAAAA	GCATTTTTGATTTATGCATGGaaacctgaaaaaaagttacaagtgtatatcagaaagggaagt tgtgccttttatagctattactgtctggttttaacaatttcctttatatttagtgaactacgctt gctcatttttcttacataattttattcaagttattgtacagctgtttaagatgggcagctag ttcgtagctttcccaaataaactctaaacattaatcaatcatctgtgtgaaaatgggttggtgct tctaacctgatg[g/a]cacttagctatcagaagaccacaaaaattgactcaaatctccagtatt cttgtcaaaaaaaaaaaaaaaaagctcatattttgtatatatctgcttcagtggagaattatat aggttgtgcaaattaacagtcctaactggtatagagcacctagtccagtgacctgctgggtaaac tgtggatgatggttgcaaaagactaatttaaaaaataactaccaagaggccctgtctgtacctaa cgccctattttgcaatggctatatggcaagaaagctggtaaactatttgtctttcaggaccttt tgaagtagtttgtataacttcttaaaagttgtgattccagataaccagctgtaacacagctgaga gacTTTTAATCAGACAAAGTAATTCCTC	678
HSD3B1 d1	HSD3B 1	C	T	V	V	cds	GE593	GCCAGATACAGAAATCATTCCAA	TAATTCCCCACCTTGCTGC	GCCAGATACAGAAATCATTCCAAtgacctgacctgtgttcacacagaactccagaacaagaccaa gctgacagtgctggaaggagacattctggatgagccattcctgaagagagcctgccaggacgt[c /t]tcggtcatcatccacaccgcctgtatcattgatgtcttcggtgtcactcacagagagtctat catgaatgtcaatgtgaaaggtatggtaggctggggaggagatGCAGCAAGGTGGGGAATTA	257
HSD3B1 d2	HSD3B 1	A	G	I	V	cds	GE593	GCCAGATACAGAAATCATTCCAA	TAATTCCCCACCTTGCTGC	GCCAGATACAGAAATCATTCCAAtgacctgacctgtgttcacacagaactccagaacaagaccaa gctgacagtgctggaaggagacattctggatgagccattcctgaagagagcctgccaggacgtct cggtc[a/g]tcatccacaccgcctgtatcattgatgtcttcggtgtcactcacagagagtctat catgaatgtcaatgtgaaaggtatggtaggctggggaggagatGCAGCAAGGTGGGGAATTA	257
HSD3B1 d3	HSD3B 1	T	A	G	G	cds	GE593	GCCAGATACAGAAATCATTCCAA	TAATTCCCCACCTTGCTGC	GCCAGATACAGAAATCATTCCAAtgacctgacctgtgttcacacagaactccagaacaagaccaa gctgacagtgctggaaggagacattctggatgagccattcctgaagagagcctgccaggacgtct cggtcatcatccacaccgcctgtatcattgatgtcttcgg[t/a]gtcactcacagagagtctat catgaatgtcaatgtgaaaggtatggtaggctggggaggagatGCAGCAAGGTGGGGAATTA	257
HSD3B1 d4	HSD3B 1	C	T	L	L	cds	GE668	GAGCTTCCTACTCAGGCCAA	GGAGAAAGGAGGAAAGTATGTAT	GAGCTTCCTACTCAGGCCAAtttacacctatcgaccgcccttcaaccgccacatagtcacattgt caaatagcgtattcaccttctcttataagaaggctcagcgagat[c/t]tggcgtataagccact ctacagctgggaggaagccaagcagaaaacggtggagtgggttggttcccttgtggaccggcaca aggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgtt aggagatgtcatcaagctccaccctcctggcctcatacagaaagtgacaagggcacaagctcagg tcctgctgcctccctttcatacaatggccaacttattgtattcctcatgtcatcaaaacctgcgc agtcattggcccaacaagaaggtttctgtcctaatcatataccagaggaaagaccatgtggtttg ctgttaccaaatctcagtagctgattctgaacaatttagggactcttttaacttgagggtcgttt tgactactagagctccatttctactcttaaatgagaaaggatttcctttctttttaatcttccat tccttcacatagtttgataaaaagatcaataaatgtttgaatgtttaatgtggagggaggtgtga gttatgttaATACATACTTTCCTCCTTTCTCC	682
HSD3B1 d5	HSD3B 1	G	T	-	-	noncoding	GE668	GAGCTTCCTACTCAGGCCAA	GGAGAAAGGAGGAAAGTATGTAT	GAGCTTCCTACTCAGGCCAAtttacacctatcgaccgcccttcaaccgccacatagtcacattgt caaatagcgtattcaccttctcttataagaaggctcagcgagatctggcgtataagccactctac agctgggaggaagccaagcagaaaacggtggagtgggttggttcccttgtggaccggcacaagga gaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgttag[g /t]agatgtcatcaagctccaccctcctggcctcatacagaaagtgacaagggcacaagctcagg tcctgctgcctccctttcatacaatggccaacttattgtattcctcatgtcatcaaaacctgcgc agtcattggcccaacaagaaggtttctgtcctaatcatataccagaggaaagaccatgtggtttg ctgttaccaaatctcagtagctgattctgaacaatttagggactcttttaacttgagggtcgttt tgactactagagctccatttctactcttaaatgagaaaggatttcctttctttttaatcttccat tccttcacatagtttgataaaaagatcaataaatgtttgaatgtttaatgtggagggaggtgtga gttatgttaATACATACTTTCCTCCTTTCTCC	682

FIG. 5GGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B1 d6	HSD3B 1	T	C	F	L	cds	GE675	GGTTGGCACCT CTTAGGGATA	GGGCGGTCGAT AGGTGTAAA	GGTTGGCACCTCTTAGGGATAtatcctgacagtgacaatatgctcttcatggacaggtacccagc tcctgttagaggcctgtgtccaagctagtgtgccagtcttcatctacaccagtagcatagaggta gccgggcccaactcctacaaggaaatcatccagaatggccatgaagaagagcctctggaaaacac atggcccgctccatacccacacagcaaaagcttgctgagaaggctgtactggcggctaacgggt ggaatctgaaaaacggcggcaccctgtacacttgtgccttacgacccatgtatatctatggggaa ggaagccgattcctttctgctagtataaacgaggccctgaacaacaatgggatcctgtcaagtgt tggaaagttctccactgttaacccagtctatgttggcaatgtggcctgggcccacattctggcct tgagggccctgcaggaccccaagaaggccccaagcatccgaggacagttctactatatctcagat gacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagttcggcctccgcct tgattccagatggagc[t/c]ttcctttatccctgatgtattggattggcttcctgctggaaata gtgagcttcctactcaggccaaTTTACACCTATCGACCGCCC	692
HSD3B2 d25	HSD3B 2	G	A	A	A	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagca tagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctg gaaaacacatggcccactccatacccgtacagcaaaagcttgctgagaaggctgtgctggc[g/ a]gctaatgggtggaatctaaaaatggtgataccttgtacacttgtgcgttaagacccacatat atctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaacccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 d26	HSD3B 2	A	G	T	T	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagca tagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctg gaaaacacatggcccactccatacccgtacagcaaaagcttgctgagaaggctgtgctggcggc taatgggtggaatctaaaaatggtgataccttgtacacttgtgcgttaagacccac[a/g]tat atctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaacccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 d27	HSD3B 2	C	T	-	-	noncoding	GE639	AAAATAAGGCA TCTGCTGAGTG TAT	CCATGCAGAGT TTAAGATGGAG	AAAATAAGGCATCTGCTGAGTGTATaaccatttacctcttgttttagccctcttctgggtcac gctagaatcagatctgctctccagcatcttctgtttcctgg[c/t]aagtgtttcctgctacttt ggattggccacgatgacgggctggagctgccttgtgacaggagcaggagggcttctgggtcagag gatcgtccgcctgttggtggaagagaaggaactgaaggagatcagggccttggacaaggccttca gaccagaattgagagaggaatttctagtaagtaaacttgagtcatgggtctgtggCTCCATCTT AAACTCTGCATGG	338

FIG. 5HHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 d28	HSD3B 2	C	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccttaaactg aagggcccttttgactaatagagctccatttccact[c/g]ttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 d29	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccc[c/t]ttaa actgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u1	HSD3B 2	C	G	R	R	cds	GE639	AAAATAAGGCA TCTGCTGAGTG TAT	CCATGCAGAGT TTAAGATGGAG	AAAATAAGGCATCTGCTGAGTGTATaaccatttacctcttgttttagccctcttctgggtcac gctagaatcagatctgctctccagcatcttctgtttcctggcaagtgtttcctgctactttggat tggccacgatgacgggctggagctgccttgtgacaggagcaggagggcttctgggtcagaggatc gtccg[c/g]ctgttggtggaagagaaggaactgaaggagatcagggccttggacaaggccttca gaccagaattgagagaggaatttctagtaagtaaacttgagtcatgggtctgtggCTCCATCTT AAACTCTGCATGG	338
HSD3B2 u10	HSD3B 2	A	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagt[a/g]gctgattctgaacaattgagggaccccttaa actgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5IIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u11	HSD3B 2	A	G	Q	R	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagca tagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctg gaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctggcggc taatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatatatct atggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggatcctg tcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggcccacat tctggccttgagggccctgc[a/g]ggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u12	HSD3B 2	C	G	T	T	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaac[c/g]gtggagtgggttggttccc ttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtg catgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaa gggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u13	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggc[c/t]tcatacagaaagcaacaa gggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u14	HSD3B 2	A	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctc[a/g]tgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5JJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u15	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaa[c/t]ctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u16	HSD3B 2	A	C	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatc aaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaac aatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactg aagggccctttgacta[a/c]tagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u17	HSD3B 2	G	T	L	L	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggaggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctact[g/t]ttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagt agcatagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcc tctggaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctgg cggctaatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatat atctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u18	HSD3B 2	C	T	L	L	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagat[c/t]t ggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttccc ttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtg catgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaa gggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaa actgaagggccctttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5KKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u19	HSD3B 2	G	A	G	S	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagca gcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcagg tacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagca tagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctg gaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctggcggc taatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatatatct atggggaagga[g/a]gcccattcctttctgccagtataaatgaggccctgaacaacaatgggat cctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggccc acattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctac tacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagtt cggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgc tggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacaca tggaaatagtgagcttcctactcagcccaatttacacctatcaacccccttcaaccgccacaca gtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u2	HSD3B 2	T	G	I	S	cds	GE601	CCAGCCAGATC CAGAAATCTT	TCTGATCCTCA TTTAACCAACT TGT	CCAGCCAGATCCAGAAATCTTtccaatgacctgacctgtgttcacacagagctccagaacaggac caagctgactgtacttgaaggagaca[t/g]tctggatgagccattcctgaaaagagcctgccag gacgtctcggtcgtcatccacaccgcctgtatcattgatgtctttggtgtcactcacagagagtc catcatgaatgtcaatgtgaaaggtacagtagcctggggaggagataaaACAAGTTGGTTAAATG AGGATCAGA	269
HSD3B2 u20	HSD3B 2	G	A	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgcc acacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcg tataagccactctacagctgggaggaagccaagcagaaaccgtggagtgggttggttcccttgt ggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatg tgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggc acaagcccag[g/a]tcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgt catcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaa aaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggacccсttaa actgaagggccctttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttc tctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u21	HSD3B 2	G	C	E	Q	cds	GE601	CCAGCCAGATC CAGAAATCTT	TCTGATCCTCA TTTAACCAACT TGT	CCAGCCAGATCCAGAAATCTTtccaatgacctgacctgtgttcacacagagctccagaacaggac caagctgactgtacttgaaggagacattctggatgagccattcctgaaaagagcctgccaggacg tctcggtcgtcatccacaccgcctgtatcattgatgtctttggtgtcactcacaga[g/c]agtc catcatgaatgtcaatgtgaaaggtacagtagcctggggaggagataaaACAAGTTGGTTAAATG AGGATCAGA	269

FIG. 5LLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u22	HSD3B 2	G	A	Q	Q	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagcagcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcaggtaccca[g/a]ctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagcatagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctggaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctggcggctaatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatatatctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggatcctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggcccacattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctactacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagttcggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgctggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u23	HSD3B 2	C	G	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggcacaagcccaggtcctgctgcctccctttcacacaatg[c/g]ccaacttactgtattcctcatgtcatcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttctctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u24	HSD3B 2	G	A	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatcaaaacctgcaca[g/a]tcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttctctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u3	HSD3B 2	C	T	V	V	cds	GE601	CCAGCCAGATC CAGAAATCTT	TCTGATCCTCA TTTAACCAACT TGT	CCAGCCAGATCCAGAAATCTTccaatgacctgacctgtgttcacacagagctccagaacaggaccaagctgactgtacttgaaggagacattctggatgagccattcctgaaaagagcctgccaggacgt[c/t]tcggtcgtcatccacaccgcctgtatcattgatgtctttggtgtcactcacagagagtccatcatgaatgtcaatgtgaaaggtacagtagcctggggaggagataaaACAAGTTGGTTAAATGAGGATCAGA	269
HSD3B2 u4	HSD3B 2	A	G	R	G	cds	GE639	AAAATAAGGCA TCTGCTGAGTG TAT	CCATGCAGAGT TTAAGATGGAG	AAAATAAGGCATCTGCTGAGTGTATaaccatttacctcttgttttagccctcttctgggtcacgctagaatcagatctgctctccagcatcttctgtttcctggcaagtgtttcctgctactttggattggccacgatgacgggctggagctgccttgtgacaggagcaggagggcttctgggtcagaggatcgtccgcctgttggtggaagagaaggaactgaaggagatcagggccttggacaaggccttc[a/g]gaccagaattgagagaggaatttctagtaagtaaacttgagtcatgggtctgtggCTCCATCTTAAACTCTGCATGG	338

FIG. 5MMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2 u5	HSD3B 2	A	G	L	L	cds	GE1194	CAGAAGAATGC ACCCTGAGTC	GCCAGATCTCG CTGAGCC	CAGAAGAATGCACCCTGAGTCtataacaaccacaccacggaggagggaggagggcacaacaagcagcgcagcaggtggcagcacctccgggagaatacctcacaacaccatcatcatcctcgtcggcaggtacccagctactgttggaggcctgtgtccaagccagtgtgccagtcttcatctacaccagtagcatagaggtagccgggcccaactcctacaaggaaatcatccagaacggccacgaagaagagcctctggaaaacacatggcccactccatacccgtacagcaaaaagcttgctgagaaggctgtgctggcggctaatgggtggaatctaaaaaatggtgataccttgtacacttgtgcgttaagacccacatatatctatggggaaggaggcccattcctttctgccagtataaatgaggccctgaacaacaatgggatcctgtcaagtgttggaaagttctccacagtcaacccagtctatgttggcaacgtggcctgggcccacattctggccttgagggccctgcaggaccccaagaaggccccaagcatccgaggacaattctactacatctcagatgacacgcctcaccaaagctatgataaccttaattacaccctgagcaaagagttcggcctccgccttgattccagatggagccttcctttaaccctgatgtactggattggcttcctgctggaaatagtgagcttcctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacatt[a/g]tcaaatagcgtattcaccttctcttacaagaaGGCTCAGCGAGATCTGGC	839
HSD3B2 u6	HSD3B 2	C	A	T	N	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgtggaccggcacaaggaga[c/a]cctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttctctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u7	HSD3B 2	A	C	*	C	cds	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgtggaccggcacaaggagaccctgaagtccaagactcagtg[a/c]tttaaggatgacagagatgtgcatgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttctctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HSD3B2 u8	HSD3B 2	C	T	-	-	noncoding	GE665	CCTGCTGGAAA TAGTGAGCTTC	GCTCTTTTTGT TGAACTGTGTG AA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaaccccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggcacaagcccaggtcctgctgcctc[c/t]ctttcacacaatgcccaacttactgtattcctcatgtcatcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaaacaatatgatttgctgttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttctctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627

FIG. 5NNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HSD3B2u9	HSD3B2	T	C	-	-	noncoding	GE665	CCTGCTGGAAATAGTGAGCTTC	GCTCTTTTTGTTGAACTGTGTGAA	CCTGCTGGAAATAGTGAGCTTCctactcagcccaatttacacctatcaacccccttcaaccgccacacagtcacattatcaaatagcgtattcaccttctcttacaagaaggctcagcgagatctggcgtataagccactctacagctgggaggaagccaagcagaaaaccgtggagtgggttggttcccttgtggaccggcacaaggagaccctgaagtccaagactcagtgatttaaggatgacagagatgtgcatgtgggtattgttaggaaatgtcatcaaactccacccacctggcctcatacagaaagcaacaagggcacaagcccaggtcctgctgcctccctttcacacaatgcccaacttactgtattcctcatgtcatcaaaacctgcacagtcactggcccaacaagaacgtttctgtcctaatcatacaccagaagaaaacaatatgatttgc[t/c]gttaccaaatctcagtagctgattctgaacaattgagggaccccttaaactgaagggcccttttgactaatagagctccatttccactcttaaatgagaaagcatttcctttctctttaatctcccattccTTCACACAGTTCAACAAAAAGAGC	627
HTR1Ad9	HTR1A	G	A	V	V	cds	GE1181	GACTGTTTGCTAGTGGGGAGA	TGAGGAAGCCAATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatggacagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggccaactccagtttcccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcctgaaagctgctcctcggagatacccttcgccgaagcagtaagaacttcctgcttgggtctctgcattcccttcctccgaaacttcccaggagaagggcggaagaccccaggggaaggggcgaggcgaatcttcgcgctgctttttcttccctccccccttcccgcgccgggcgcgcaggcatggatgtgctcagccctggtcagggcaacaacaccacatcaccaccggctccctttgagaccggcggcaacactactggtatctccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctgcgcggtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtggccaattatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatggccgcgctgtatcaggt[g/a]ctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgccctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtactgggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatctcgctcacTTGGCTTATTGGCTTCCTCA	873
HTR1Au1	HTR1A	C	T	A	V	cds	GE1181	GACTGTTTGCTAGTGGGGAGA	TGAGGAAGCCAATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatggacagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggccaactccagtttcccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcctgaaagctgctcctcggagatacccttcgccgaagcagtaagaacttcctgcttgggtctctgcattcccttcctccgaaacttcccaggagaagggcggaagaccccaggggaaggggcgaggcgaatcttcgcgctgctttttcttccctccccccttcccgcgccgggcgcgcaggcatggatgtgctcagccctggtcagggcaacaacaccacatcaccaccggctccctttgagaccggcggcaacactactggtatctccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctgcg[c/t]ggtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtggccaattatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatggccgcgctgtatcaggtgctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgccctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtactgggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatctcgctcacTTGGCTTATTGGCTTCCTCA	873

FIG. 50000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Au 2	HTR1A	G	C	L	F	cds	GE1180	TGCGCTCATCT CGCTCA	GCATAGTGAAT GGGACGGAT	TGCGCTCATCTCGCTCActtggcttattggcttcctcatctctatcccgcccatcctgggctggc gcaccccggaagaccgctcggaccccgacgcatgcaccattagcaaggatcatggctacactatc tattccacctttggagctttctacatcccgctgctgctcatgctggttctctatgggcgcatatt ccgagctgcgcgcttccgcatccgcaagacggtcaaaaaggtggagaagaccggagcggacaccc gccatggnnagcatctcccgccccgcagcccaagaagagtgtgaatggagagtcggggagcagg aactggaggctgggcgtggagagcaaggctgggggtgctctgtgcgccaatggcgcggtgaggca aggtgacgatggcgccgccctggaggtgatcgaggtgcaccgagtgggcaactccaaagagcact tgcctctgcccagcgaggctggtcctaccccttgtgcccccgcctctttcgagaggaaaaatgag cgcaacgccgaggcgaagcgcaagatggccctggcccgagagaggaagacagtgaagacgctggg catcatcatgggcaccttcatcctctgctggctgcccttcttcatcgtggctcttgttctgccct tctgcgagagcagctgccacatgcccaccctgtt[g/c]ggcgccataatcaattggctgggcta ctccaactctctgcttaaccccgtcatttacgcatacttcaacaaggactttcaaaacgcgttta agaagatcattaagtgtaacttctgccgccagtgatgacggaggagtagccggccagtcgaggct acaggATCCGTCCCATTCACTATGC	870
HTR1Au 3	HTR1A	C	T	-	-	noncoding	GE1179	CCCTGAGGGAG TAAGGC	GGCTGCCGGAG CTGGAG	CCCTGAGGGAGTAAGGCtggactgttagatgatagcggaggtaccgttttgttgttgttgtcgtc gttgttcgtttgtttttggagacggagtctcgctctgt[c/t]gcccaggctggagtgcaatggc gcgagaacggaggtagcttttaaaaacgaagacacactcggtcttcttccatcaattagcaata attgggagactgacccaggactgttcaccttcccattcaggctccctatgcttcctttttctcatc tcctattgccactctgggatgctgacacgatttaagaatttggcagataatatgacccaaggagt agttggaattccctcccccaagtttttccaaccccagtttgctgggttggaggcggagtttatt tgttacaaccttggtctgaccggcagggacctggtgtgtgtaagtgagttctgagtctctgttga caaaaagagactcgaatgcaaagacgctgagctagagggagaggagggcggggacccagaggaaa gaggcactcctcggggttggggaagtattaggaggggagggttagagtgggagggaaggagctcg ctttcgaagcgactcacagagggataaataaagggaagtgaggaggaagagggagacttaaaggg aaggcaggtggggagaagggggacgaaagaggcagaagagagagaagagaggaggagagaggggg agagagggaaggaaggaaatagcgagaggagggtcacagagtgaccgtggaggatggggcttctc ggttctagatatttctgtgattggagactgtttgctagtggggagaCTCCAGCTCCGGCAGCC	843
HTR1Au 4	HTR1A	C	T	-	-	noncoding	GE1179	CCCTGAGGGAG TAAGGC	GGCTGCCGGAG CTGGAG	CCCTGAGGGAGTAAGGCtggactgttagatgatagcggaggtaccgttttgttgttgttgtcgtc gttgttcgtttgtttttggagacggagtctcgctctgtcgcccagg[c/t]tggagtgcaatggc gcgagaacggaggtagcttttaaaaacgaagacacactcggtcttcttccatcaattagcaata attgggagactgacccaggactgttcaccttcccattcaggctccctatgcttcctttttctcatc tcctattgccactctgggatgctgacacgatttaagaatttggcagataatatgacccaaggagt agttggaattccctcccccaagtttttccaaccccagtttgctgggttggaggcggagtttatt tgttacaaccttggtctgaccggcagggacctggtgtgtgtaagtgagttctgagtctctgttga caaaaagagactcgaatgcaaagacgctgagctagagggagaggagggcggggacccagaggaaa gaggcactcctcggggttggggaagtattaggaggggagggttagagtgggagggaaggagctcg ctttcgaagcgactcacagagggataaataaagggaagtgaggaggaagagggagacttaaaggg aaggcaggtggggagaagggggacgaaagaggcagaagagagagaagagaggaggagagaggggg agagagggaaggaaggaaatagcgagaggagggtcacagagtgaccgtggaggatggggcttctc ggttctagatatttctgtgattggagactgtttgctagtggggagaCTCCAGCTCCGGCAGCC	843

FIG. 5PPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Au 5	HTR1A	C	G	-	-	noncoding	GE1179	CCCTGAGGGAG TAAGGC	GGCTGCCGGAG CTGGAG	CCCTGAGGGAGTAAGGCtggactgttagatgatagcggaggtaccgttttgttgttgttgtcgtc gttgttcgtttgttttggagacggagtctcgctctgtcgcccaggctggagtgcaatggcgcga gaacggaggtagcttttaaaaa[c/g]gaagacacactcggtcttcttccatcaattagcaata attgggagactgacccaggactgttcaccttcccattcaggctccctatgcttccttttctcatc tcctattgccactctgggatgctgacacgatttaagaatttggcagataatatgacccaaggagt agttggaattccctcccccaagtttttccaaccccagttttgctgggttggaggcggagtttatt tgttacaaccttggtctgaccggcagggacctggtgtgtgtaagtgagttctgagtctctgttga caaaaagagactcgaatgcaaagacgctgagctagagggagaggagggcggggacccagaggaaa gaggcactcctcggggttggggaagtattaggaggggagggttagagtgggagggaaggagctcg ctttcgaagcgactcacagagggataaataaagggaagtgaggaggaagagggagacttaaaggg aaggcaggtggggagaagggggacgaaagaggcagaagagagagaagagaggaggagagaggggg agagagggaaggaaggaaatagcgagaggagggtcacagagtgaccgtggaggatggggcttctc ggttctagatatttctgtgattggagactgtttgctagtggggagaCTCCAGCTCCGGCAGCC	843
HTR1Au 6	HTR1A	C	T	-	-	noncoding	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatgga cagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggcc aactccagtttcccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcctgaa agctgctcctcggagatacccttcgccgaagcagtaagaacttcctgcttgggtctctgcattcc cttcctccgaaacttcccaggagaagggcggaagacc[c/t]caggggaaggggcgaggcgaatc ttcgcgctgctttttcttccctccccctttcccgcgccgggcgcgcaggcatggatgtgctcagcc ctggtcagggcaacaacaccacatcaccaccggctccctttgagaccggcggcaacactactggt atctccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctg cgcggtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtgg ccaattatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatg gccgcgctgtatcaggtgctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgc cctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtact gggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatc tcgctcacTTGGCTTATTGGCTTCCTCA	873
HTR1Au 7	HTR1A	G	C	A	P	cds	GE1181	GACTGTTTGCT AGTGGGGAGA	TGAGGAAGCCA ATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatgga cagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggcc aactccagtttcccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcctgaa agctgctcctcggagatacccttcgccgaagcagtaagaacttcctgcttgggtctctgcattcc cttcctccgaaacttcccaggagaagggcggaagaccccaggggaaggggcgaggcgaatcttcg cgctgctttttcttccctccccctttcccgcgccgggcgcgcaggcatggatgtgctcagccctgg tcagggcaacaacaccacatcaccaccg[g/c]ctccctttgagaccggcggcaacactactggt atctccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctg cgcggtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtgg ccaattatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatg gccgcgctgtatcaggtgctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgc cctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtact gggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatc tcgctcacTTGGCTTATTGGCTTCCTCA	873

FIG. 5QQQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Au8	HTR1A	C	A	-	-	noncoding	GE1181	GACTGTTTGCTAGTGGGGAGA	TGAGGAAGCCAATAAGCCAA	GACTGTTTGCTAGTGGGGAGActccagctccggcagccagttcgggagcggcaaagtaaaatgga cagcgacagacagacgttccagccacctctccgccgccgggagatcctggagctgctttcaggcc aactccagttt[c/a]ccagctggagcttctgaacgcgctggactgcgagagcccagggagcgcc tgaaagctgctcctcggagatacccttcgccgaagcagtaagaacttcctgcttgggtctctgca ttcccttcctccgaaacttcccaggagaagggcggaagaccccaggggaaggggcgaggcgaatc ttcgcgctgcttttcttccctccccttcccgcgccgggcgcgcaggcatggatgtgctcagcc ctggtcagggcaacaacaccacatcaccaccggctccctttgagaccggcggcaacactactggt atctccgacgtgaccgtcagctaccaagtgatcacctctctgctgctgggcacgctcatcttctg cgcggtgctgggcaatgcgtgcgtggtggctgccatcgccttggagcgctccctgcagaacgtgg ccaattatcttattggctctttggcggtcaccgacctcatggtgtcggtgttggtgctgcccatg gccgcgctgtatcaggtgctcaacaagtggacactgggccaggtaacctgcgacctgttcatcgc cctcgacgtgctgtgctgcacctcatccatcttgcacctgtgcgccatcgcgctggacaggtact gggccatcacggaccccatcgactacgtgaacaagaggacgccccggcgcgccgctgcgctcatc tcgctcacTTGGCTTATTGGCTTCCTCA	873
HTR1DBu1	HTR1DB	G	C	V	V	cds	GE1318	GCCCTTCTTCTGGCGTC	CCTACCTGTGGAACCAGACA	GCCCTTCTTCTGGCGTCaggctaaggccgaagaggaggtgtcggaatgcgtggtgaacaccgacc acatcctctacacggtctactccacggtgggtgctttctacttccccaccctgctcctcatcgcc ctctatggccgcatctacgtagaagcccgctcccggatttgaaacagacgcccaacaggaccgg caagcgcttgacccgagcccagctgataaccgactcccccgggtccacgtcctcggtcacctcta ttaactcgcgggttcccgacgtgcccagcgaatccggatctcctgtgtatgt[g/c]aaccaagt caaagtgcgagtctccgacgccctgctggaaaagaagaaactcatggccgctagggagcgcaaag ccaccaagaccctagggatcatttgggagcctttattgtgtgttggctacccttcttcatcatc tccctagtgatgcctatctgcaaagatgcctgctggttccacctagccatctttgacttcttcac atggctgggctatctcaactccctcatcaaccccataatctataccatgtccaatgaggacttta aacaagcattccataaactgatacgttttaagtgcacaagttgacttgccgtttgcagtggggtc gcctaagcgacctttggggaccaagttgTGTCTGGTTCCACAGGTAGG	698
HTR1DBu2	HTR1DB	G	A	-	-	noncoding	GE1318	GCCCTTCTTCTGGCGTC	CCTACCTGTGGAACCAGACA	GCCCTTCTTCTGGCGTCaggctaaggccgaagaggaggtgtcggaatgcgtggtgaacaccgacc acatcctctacacggtctactccacggtgggtgctttctacttccccaccctgctcctcatcgcc ctctatggccgcatctacgtagaagcccgctcccggatttgaaacagacgcccaacaggaccgg caagcgcttgacccgagcccagctgataaccgactcccccgggtccacgtcctcggtcacctcta ttaactcgcgggttcccgacgtgcccagcgaatccggatctcctgtgtatgtgaaccaagtcaaa gtgcgagtctccgacgccctgctggaaaagaagaaactcatggccgctagggagcgcaaagccac caagaccctagggatcatttgggagcctttattgtgtgttggctacccttcttcatcatctccc tagtgatgcctatctgcaaagatgcctgctggttccacctagccatctttgacttcttcacatgg ctgggctatctcaactccctcatcaaccccataatctataccatgtccaatgaggactttaaaca agcattccataaactgatacgttttaagtgcacaagttgacttgcc[g/a]tttgcagtggggtc gcctaagcgacctttggggaccaagttgTGTCTGGTTCCACAGGTAGG	698

FIG. 5RRRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1DBu3	HTR1DB	C	T	S	S	cds	GE1163	CTTCGTCCGCTCCATGCC	CACCACGCATTCCGACA	CTTCGTCCGCTCCATGCCcaagagctgcgctccggagctggggcgaggagagccatggaggaaccgggtgctcagtgcgctccaccgccgcccgcgggctccgagacctgggttcctcaagccaacttatcctctgctccctcccaaaactgcagcgccaaggactacatttaccaggactc[c/t]atctccctaccctggaaagtactgctggttatgctattggcgctcatcaccttggccaccacgctctccaatgcctttgtgattgccacagtgtaccggacccggaaactgcacaccccggctaactacctgatcgcctctctggcggtcaccgacctgcttgtgtccatcctggtgatgcccatcagcaccatgtacactgtcaccggccgctggacactgggccaggtggtctgtgacttctggctgtcgtcggacatcacttgttgcactgcctccatcctgcacctctgtgtcatcgccctggaccgctactgggccatcacggacgccgtggagtactcagctaaaaggactcccaagagggcggcggtcatgatcgcgctggtgtgggtcttctccatctctatctcgctgccgcccttcttctggcgtcaggctaaggccgaagaggaggTGTCGGAATGCGTGGTG	661
HTR1DBu4	HTR1DB	T	G	V	G	cds	GE1163	CTTCGTCCGCTCCATGCC	CACCACGCATTCCGACA	CTTCGTCCGCTCCATGCCcaagagctgcgctccggagctggggcgaggagagccatggaggaaccgggtgctcagtgcgctccaccgccgcccgcgggctccgagacctgggttcctcaagccaacttatcctctgctccctcccaaaactgcagcgccaaggactacatttaccaggactccatctccctaccctggaaagtactgctggttatgctattggcgctcatcaccttggccaccacgctctccaatgcctttgtgattgccacagtgtaccggacccggaaactgcacaccccggctaactacctgatcgcctctctggcggtcaccgacctgcttgtgtccatcctggtgatgcccatcagcaccatgtacactgtcaccggccgctggacactgggccaggtgg[t/g]ctgtgacttctggctgtcgtcggacatcacttgttgcactgcctccatcctgcacctctgtgtcatcgccctggaccgctactgggccatcacggacgccgtggagtactcagctaaaaggactcccaagagggcggcggtcatgatcgcgctggtgtgggtcttctccatctctatctcgctgccgcccttcttctggcgtcaggctaaggccgaagaggaggTGTCGGAATGCGTGGTG	661
HTR1Du1	HTR1D	G	C	V	L	cds	GE1162	TTGAAGGAAGGAGCCAAATG	TGTAGGAGATCTGAGAGGTGTTCA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccactgaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacctcagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtcatcacactggccaca[g/c]tcctctccaatgcctttgtactcaccaccatcttactcaccaggaagctccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttggtaatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgacatctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattgctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccacgcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctggcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du10	HTR1D	C	T	S	L	cds	GE1161	AGGAGGAGATGTCGGACTGT	ATCCCGATGAGGTTACAGGA	AGGAGGAGATGTCGGACTGTctggtgaacacctctcagatctcctacaccatctactccacctgtggggccttctacattccctcggtgttgctcatcatcctatatggccggatctaccgggctgcccggaaccgcatcctgaatccaccctcactctatgggaagcgcttcaccacggcccacctcatcacaggctctgccgggtcctcgctctgctcgctcaactccagcctccatgaggggcact[c/t]gcactcggctggctcccctctctttttcaaccacgtgaaaatcaagcttgctgacagtgccctggaacgcaagaggatttctgctgctcgagaaaggaaagccactaaaatcctgggcatcattctgggggcctttatcatctgctggctgcccttcttcgtggtgtctctggtcctccccatctgccgggactcctgctggatccacccggcgctctttgacttcttcacctggctaggctatttaaactccctcatcaatccaataatctacactgtgtttaatgaagagtttcggcaagcttttcagaaaattgtccctttccggaaggcctcctagtcttattcggtgatgacgcaaagaaactttgtgTCCTGTAACCTCATCGGGAT	648

FIG. 5SSSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Du 11	HTR1D	C	A	A	D	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattgctct ggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccacgcgg ccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctggcgg caggccaagg[c/a]ccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 2	HTR1D	T	C	H	H	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtcctctgacatcacgtgctgcacagcctccatcctgca[t/c]ctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 3	HTR1D	T	C	A	A	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattgc[t/ c]ctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 4	HTR1D	T	C	N	N	cds	GE1161	AGGAGGAGATG TCGGACTGT	ATCCCGATGAG GTTACAGGA	AGGAGGAGATGTCGGACTGTctggtgaacacctctcagatctcctacaccatctactccacctgt ggggccttctacattccctcggtgttgctcatcatcctatatggccggatctaccgggctgcccg gaaccgcatcctgaatccaccctcactctatgggaagcgcttcaccacggcccacctcatcacag gctctgccgggtcctcgctctgctcgctcaactccagcctccatgagggcactcgcactcggct ggctcccctctcttttttcaaccacgtgaaaatcaagcttgctgacagtgccctggaacgcaagag gatttctgctgctcgagaaaggaaagccactaaaatcctgggcatcattctgggggcctttatca tctgctggctgcccttcttcgtggtgtctctggtcctccccatctgccgggactcctgctggatc cacccggcgctctttgacttcttcacctggctaggctatttaaactccctcatcaatccaataat ctacactgtgtttaa[t/c]gaagagtttcggcaagcttttcagaaaattgtccctttccggaag gcctcctagtcttattcggtgatgacgcaaagaaactttgtgTCCTGTAACCTCATCGGGAT	648

FIG. 5TTTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Du 5	HTR1D	A	G	T	T	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcac[a/g]ctggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccagga agctccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatc ttggtaatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtg tgacatctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 6	HTR1D	T	C	I	I	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgat[t/c]ggctccctggccaccaccgacctcttggtttccatc ttggtaatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtg tgacatctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 7	HTR1D	C	G	S	S	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtc[c/g]tctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattg ctctggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1Du 8	HTR1D	A	C	A	A	cds	GE1162	TTGAAGGAAGG AGCCAAATG	TGTAGGAGATC TGAGAGGTGTT CA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattgctct ggacaggtactgggc[a/c]atcacagatgccctggaatacagtaaacgcaggacggctggccac gcggccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctg gcggcaggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650

FIG. 5UUUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Du9	HTR1D	G	T	R	R	cds	GE1162	TTGAAGGAAGGAGCCAAATG	TGTAGGAGATCTGAGAGGTGTTCA	TTGAAGGAAGGAGCCAAATGtgtggaggtctgtgggaagagagagccacctagcatgtccccact gaaccagtcagcagaaggccttccccaggaggcctccaacagatccctgaatgccacagaaacct cagaggcttgggatcccaggaccctccaggcgctcaagatctcccttgccgtggtcctttccgtc atcacactggccacagtcctctccaatgcctttgtactcaccaccatcttactcaccaggaagct ccacacccctgccaactacctgattggctccctggccaccaccgacctcttggtttccatcttgg taatgcccatcagcatcgcctataccatcacccacacctggaactttggccaaatcttgtgtgac atctggctgtcctctgacatcacgtgctgcacagcctccatcctgcatctctgtgtcattgctct ggacaggtactgggcaatcacagatgccctggaatacagtaaacgcaggacggctggccacgcgg ccaccatgatcgccattgtctgggccatctccatctgcatctccatcccccgctcttctggcg[g/t]caggccaaggcccaggaggagatgtcggactgtctggTGAACACCTCTCAGATCTCCTACA	650
HTR1ELu1	HTR1EL	C	T	I	I	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATttttcagctatattaatcttttaaaacaaagaaaatggatttc ttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattct ggtgtccctcactctgtctgggctggcactyatgacaacaactatcaactcccttgtgat[c/t] gctgcaattattgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagt cacagatttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagct ggattatggggcaagtggtctgtgacatttggctgagtgttgacattacctgctgcacgtgctcc atcttgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttgagtatgc caggaaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgtttta tctctatgcctcctctattctggaggcaccaaggaactagcagagatgatgaatgcatcatcaag cacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640
HTR1ELu2	HTR1EL	T	C	I	T	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATttttcagctatattaatcttttaaaacaaagaaaatggatttc ttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattct ggtgtccctcactctgtctgggctggcactgatgacaacaactatcaactcccttgtgatcgctg caatta[t/c]tgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagt cacagatttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagct ggattatggggcaagtggtctgtgacatttggctgagtgttgacattacctgctgcacgtgctcc atcttgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttgagtatgc caggaaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgtttta tctctatgcctcctctattctggaggcaccaaggaactagcagagatgatgaatgcatcatcaag cacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640
HTR1ELu3	HTR1EL	T	G	V	G	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATttttcagctatattaatcttttaaaacaaagaaaatggatttc ttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattct ggtgtccctcactctgtctgggctggcactgatgacaacaactatcaactcccttgtgatcgctg caattattgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagtcaca gatttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagctggat tatggggcaagtgg[t/g]ctgtgacatttggctgagtgttgacattacctgctgcacgtgctcc atcttgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttgagtatgc caggaaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgtttta tctctatgcctcctctattctggaggcaccaaggaactagcagagatgatgaatgcatcatcaag cacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640

FIG. 5VVVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1ELu4	HTR1EL	A	T	E	V	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATtttcagctatattaatcttttaaaacaaagaaaatggatttc ttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattct ggtgtccctcactctgtctgggctggcactgatgacaacaactatcaactcccttgtgatcgctg caattattgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagtcaca gatttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagctggat tatggggcaagtggtctgtgacatttggctgagtgttgacattacctgctgcacgtgctccatct tgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttg[a/t]gtatgc caggaaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgtttta tctctatgcctcctctattctggaggcaccaaggaactagcagagatgatgaatgcatcatcaag cacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640
HTR1ELu5	HTR1EL	T	A	I	I	cds	GE1158	CGACCACATTGTTTCCACCA	AGTTATTCCTCCCCTCAAAA	CGACCACATTGTTTCCACCAttactcaacatttggagctttctacatcccactggcattgattt tgatcctttactacaaaatatatagagcagcaaagacattataccacaagagacaagcaagtagg attgcaaaggaggaggtgaatggccaagtcctttggagagtggtgagaaaagcactaaatcagt ttccacatcctatgtactagaaaagtctttatctgacccatcaacagactttgataaaat[t/a] catagcacagtgagaagtctcaggtctgaattcaagcatgagaaatcttggagaaggcaaaagat ctcaggtacaagagaacggaaagcagccactaccctgggattaatcttgggtgcatttgtaatat gttggcttcctttttttgtaaaagaattagttgttaatgtctgtgacaaatgtaaaatttctgaa gaaatgtccaatttttggcatggcttgggtatctcaattcccttataaatccactgatttacac aatctttaatgaagacttcaagaaagcattccaaaagcttgtgcgatgtcgatgttagttttaaa aatgtttattattgaaggatgggggtTTTTGAGGGGAGGAATAACT	631
HTR1ELu6	HTR1EL	T	G	D	E	cds	GE1160	TTCCCTTGTTACAGGTATCCAT	GTGGGATGTAGAAAGCTCCA	TTCCCTTGTTACAGGTATCCATtttcagctatattaatcttttaaaacaaagaaaatggatttc ttaaattcatctgatcaaaacttgacctcagaggaactgttaaacagaatgccatccaaaattct ggtgtccctcactctgtctgggctggcactgatgacaacaactatcaactcccttgtgatcgctg caattattgtgacccggaagctgcaccatccagccaattatttaatttgttcccttgcagtcaca gatttcttgtggctgtcctggtgatgcccttcagcattgtgtatattgtgagagagagctggat tatggggcaagtggtctgtgacatttggctgagtgttgacattacctgctgcacgtgctccatct tgcatctctcagctatagctttggatcggtatcgagcaatcacagatgctgttgagtatgccagg aaaaggactccaaagcatgctggcattatgattacaatagtttggattatatctgttttatctc tatgcctcctctattctggaggcaccaaggaactagcagagatga[t/g]gaatgcatcatcaag cacgaccacattgtttccaccatttactcaacattTGGAGCTTTCTACATCCCAC	640
HTR1Eu1	HTR1E	T	C	I	T	cds	GE1157	CAGCCAAAGGAAAATAACCAA	GCACCCAGCGTGGAGTAAAT	CAGCCAAAGGAAAATAACCAAcagcttctccacagtgtagactgaaacaagggaaacatgaacat cacaaactgtaccacagaggccagcatggctataagacccaagaccatcactgagaagatgctca tttgcatgactctggtggtcatcaccaccctcaccacgttgctgaacttggctgtga[t/c]cat ggctattggcaccaccaagaagctccaccagcctgccaactacctaatctgttctctggccgtga cggacctcctggtggcagtgctcgtcatgcccctgagcatcatctacattgtcatggatcgctgg aagcttgggtacttcctctgtgaggtgtggctgagtgtggacatgacctgctgcacctgctccat cctccacctctgtgtcattgccctggacaggtactgggccatcaccaatgctattgaatacgcca ggaagaggacggccaagagggccgcgctgatgatccttaccgtctggaccatctccatttcatc tccatgccccctctgttctggagaagccaccgccgcctaagccctccccctagtcagtgcaccat ccagcacgaccatgttatctacaccATTTACTCCACGCTGGGTGC	630

FIG. 5WWWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR1Eu 2	HTR1E	G	T	E	D	cds	GE1156	GCACGACCATG TTATCTACACC	CCCATCCACTC ATGAGGCT	GCACGACCATGTTATCTACACCatttactccacgctgggtgcgttttatatccccttgactttga tactgattctctattaccggatttaccacgcggccaagagcctttaccagaaaggggatcaagt cggcacttaagcaacagaagcacagatagccagaattcttttgcaagttgtaaacttacacagac tttctgtgtgtctgacttctccacctcagaccctaccacagagtttgaaaagttccatgcctcca tcaggatccccccttcgacaatgatctagatcacccaggagaacgtcagcagatctctagcacc agggaacggaaggcagcacgcatcctggggctgattctgggtgcattcattttatcctggctgcc atttttcatcaaaga[g/t]ttgattgtgggtctgagcatctacaccgtgtcctcggaagtggcc gactttctgacgtggctcggttatgtgaattctctgatcaaccctctgctctatacgagttttaa tgaagactttaagctggcttttaaaaagctcattagatgccgagagcatacttagactgtaaaaa gctaaaaggcacgacttttttccagAGCCTCATGAGTGGATGGG	628
HTR1Eu 3	HTR1E	C	A	L	I	cds	GE1156	GCACGACCATG TTATCTACACC	CCCATCCACTC ATGAGGCT	GCACGACCATGTTATCTACACCatttactccacgctgggtgcgttttatatccccttgactttga tactgattctctattaccggatttaccacgcggccaagagcctttaccagaaaggggatcaagt cggcacttaagcaacagaagcacagatagccagaattcttttgcaagttgtaaa[c/a]ttacac agactttctgtgtgtctgacttctccacctcagaccctaccacagagtttgaaaagttccatgcc tccatcaggatccccccttcgacaatgatctagatcacccaggagaacgtcagcagatctctag caccagggaacggaaggcagcacgcatcctggggctgattctgggtgcattcattttatcctggc tgccatttttcatcaaagagttgattgtgggtctgagcatctacaccgtgtcctcggaagtggcc gactttctgacgtggctcggttatgtgaattctctgatcaaccctctgctctatacgagttttaa tgaagactttaagctggcttttaaaaagctcattagatgccgagagcatacttagactgtaaaaa gctaaaaggcacgacttttttccagAGCCTCATGAGTGGATGGG	628
HTR1Eu 4	HTR1E	C	T	H	H	cds	GE1157	CAGCCAAAGGA AAATAACCAA	GCACCCAGCGT GGAGTAAAT	CAGCCAAAGGAAAATAACCAAcagcttctccacagtgtagactgaaacaagggaaacatgaacat cacaaactgtaccacagaggccagcatggctataagacccaagaccatcactgagaagatgctca tttgcatgactctggtggtcatcaccaccctcaccacgttgctgaacttggctgtgatcatggct attggcaccaccaagaagctccaccagcctgccaactacctaatctgttctctggccgtgacgga cctcctggtggcagtgctcgtcatgcccctgagcatcatctacattgtcatggatcgctggaagc ttgggtacttcctctgtgaggtgtggctgagtgtggacatgacctgctgcacctgctccatcctc cacctctgtgtcattgccctggacaggtactgggccatcaccaatgctattgaatacgccaggaa gaggacggccaagagggccgcgctgatgatccttaccgtctggaccatctccattttcatctcca tgccccctctgttctggagaagccaccgccgcctaagccctcccccctagtcagtgcaccatccag ca[c/t]gaccatgttatctacaccATTTACTCCACGCTGGGTGC	630
HTR1Eu 5	HTR1E	C	T	S	F	cds	GE1156	GCACGACCATG TTATCTACACC	CCCATCCACTC ATGAGGCT	GCACGACCATGTTATCTACACCatttactccacgctgggtgcgttttatatccccttgactttga tactgattctctattaccggatttaccacgcggccaagagcctttaccagaaaggggatcaagt cggcacttaagcaacagaagcacagatagccagaattcttttgcaagttgtaaacttacacagac tttctgtgtgtctgacttctccacctcagaccctaccacagagtttgaaaagttccatgcct[c/ t]catcaggatccccccttcgacaatgatctagatcacccaggagaacgtcagcagatctctag caccagggaacggaaggcagcacgcatcctggggctgattctgggtgcattcattttatcctggc tgccatttttcatcaaagagttgattgtgggtctgagcatctacaccgtgtcctcggaagtggcc gactttctgacgtggctcggttatgtgaattctctgatcaaccctctgctctatacgagttttaa tgaagactttaagctggcttttaaaaagctcattagatgccgagagcatacttagactgtaaaaa gctaaaaggcacgacttttttccagAGCCTCATGAGTGGATGGG	628

FIG. 5XXXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Aa 16	HTR2A	C	A	S	Y	cds	GE1176	TGTTTCATTTTCTGTTCAACTCC	TCACACACAGCTCACCTT	TGTTTCATTTTCTGTTCAACTCCaggtatatccatgccaataccagtctttgggctacaggacga ttcgaaggtctttaaggaggggagttgcttactcgccgatgataactttgtcctgatcggctctt ttgtgtcattttcattcccttaaccatcatggtgatcacctactttctaactatcaagtcactc cagaaagaagctactttgtgtgtaagtgatcttggcacacgggccaaattagcttctttcagctt cctccctcagagttctttgtcttcagaaaagctcttccagcggtcgatccatagggagccagggt cctacacaggcaggaggactatgcagtccatcagcaatgagcaaaggcatgcaaggtgctgggc atcgtcttcttcctgtttgtggtgatgtggtgccctttcttcatcacaaacatcatggccgtcat ctgcaaagagtcctgcaatgaggatgtcattggggccctgctcaatgtgtttgtttggatcggtt atctctcttcagcagtcaacccactagtctacacactgttcaacaagacctataggtcagccttt tcacggtatattcagtgtcagtacaaggaaaacaaaaaaccattgcagttaattttagtgaacac aataccggctttggcctacaagtctagccaacttcaaatgggacaaaaaagaattcaaagcaag atgccaagacaacagataatgactgctcaatggttgctctaggaaagcagcatt[c/a]tgaaga ggcttctaaagacaatagcgacggagtgaatgaaAAGGTGAGCTGTGTGTGA	832
HTR2Aa 17	HTR2A	A	G	I	V	cds	GE1272	GGTTGCTCACTGATACCAA	GAGACTCTGAAATATGTTGCC	GGTTGCTCACTGATACCAAccttctgcctcatagggtaccggtggcctctgccgagcaagctttg tgcagtctggatttacctggacgtgctcttctccacggcctccatcatgcacctctgcgccatct cgctggaccgctacgtcgccatccagaatcccatccaccacagccgcttcaactccagaactaag gcatttctgaaaatc[a/g]ttgctgtttggaccatatcagtaggtaagtGGCAACATATTTCAG AGTCTC	266
HTR2Aa 18	HTR2A	C	T	D	D	cds	GE1272	GGTTGCTCACTGATACCAA	GAGACTCTGAAATATGTTGCC	GGTTGCTCACTGATACCAAccttctgcctcatagggtaccggtggcctctgccgagcaagctttg tgcagtctggatttacctggacgtgctcttctccacggcctccatcatgcacctctgcgccatct cgctgga[c/t]cgctacgtcgccatccagaatcccatccaccacagccgcttcaactccagaac taaggcatttctgaaaatcattgctgtttggaccatatcagtaggtaagtGGCAACATATTTCAG AGTCTC	266
HTR2Aa 19	HTR2A	A	C	-	-	noncoding	GE1167	TGGTACTGCGAAACCAA	CGCACTGCTAGGATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctg[a/c]agaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaat agtttatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaa ttccactctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729

FIG. 5YYYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Ad 14	HTR2A	C	T	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgccagacactcacagcactc[c/t]gag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Ad 15	HTR2A	G	A	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtgaaccctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaattttctt tccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagt tgtctgctaatctttacttaagactttttgtttcctttattagctaagcaacattataggag ctgaaattcctgacagcagctgtggcaattcagcctaagaatggctgagaactgtaacccaaaga tacatccaattactatgggattaacactggatgtatttttaattgactttcttaatgtagaatgt gtacatccccactgtttctgattgcatgctatttaataatactgttgctaaactagtaccatc[g/a]gcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaactttttctt ctttgtccagaacatttatcttccccgaacgctcaaaaaaaccctgcaacctctatgctaaaag tttcattctgcttttTTGTCCTCGGTTTGGTGAG	749
HTR2Au 1	HTR2A	G	C	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccaca[g/c]actgcctagccaccctgagcctatgtggccaatgtcagtaa ttccactctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729

FIG. 5ZZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Au 10	HTR2A	C	T	A	V	cds	GE1176	TGTTTCATTTTCTGTTCAACTCC	TCACACACAGCTCACCTT	TGTTTCATTTTCTGTTCAACTCCaggtatatccatgccaataccagtctttgggctacaggacgattcgaaggtctttaaggaggggagttgcttactcgccgatgataactttgtcctgatcggctctttgtgtcattttcattcccttaaccatcatggtgatcacctactttctaactatcaagtcactccagaaagaagctactttgtgtgtaagtgatcttggcacacgggccaaattagcttctttcagcttcctccctcagagttctttgtcttcagaaaagctcttccagcggtcgatccatagggagccagggtcctacacaggcaggaggactatgcagtccatcagcaatgagcaaaaggcatgcaaggtgctgggcatcgtcttcttcctgtttgtggtgatgtggtgccctttcttcatcacaaacatcatggccgtcatctgcaaagagtcctgcaatgaggatgtcattggggccctgctcaatgtgtttgtttggatcggttatctctcttcagcagtcaacccactagtctacacactgttcaacaagacctataggtcagcctttttcacggtatattcagtgtcagtacaaggaaaacaaaaaaccattgcagttaatttagtgaacacaataccggctttggcctacaagtctagccaacttcaaatgggacaaaaaaagaattcaaagcagatgccaagacaacagataatgactgctcaatggttg[c/t]tctaggaaagcagcattctgaagaggcttctaaagacaatagcgacggagtgaatgaaAAGGTGAGCTGTGTGTGA	832
HTR2Au 11	HTR2A	G	T	G	*	cds	GE1172	TGCAACCTCTATGCTAAAAG	TGCTCTTTATTACCAGTGCG	TGCAACCTCTATGCTAAAAGtttcattctgctttttgtcctcggtttggtgagaaaataataaaaccaaacagtggactctcctaaaattgtgaatgaagaaaacttacagccaccacagttcagttctttaactatcattgtaataatggaagacaaaaatccagccccgggagaacagcatgtacaccagcctcagtgttacagagtgtgggtacatcaaggtgaatagtgagcagaaactataacctgttagtccttctacacctcatctgctacaagttctggcttagacatggatattctttgtgaagaaatacttctttgagctcaactacgaactccctaatgcaattaaatgatgacaccaggctctacagtaatgactttaactcc[g/t]gagaagctaacacttctgatgcatttaactggacagtcgactctgaaaatcgaaccaacctttcctgtgaagggtgcctctcaccgtcgtgtctctccttacttcatctccaggaaaaaaactggtctgctttactgacagccgtagtgattattctaactattgctggaaacatactcgtcatcatggcagtgtccctagagaaaaagctgcagaatgccaccaactatttcctgatgtcacttgccatagctgatatgctgctgggtttccttgtcatgcccgtgtccatgttaaccatcctgtatggtgagtggcattagtttcccagctatattCGCACTGGTAATAAAGAGCA	760
HTR2Au 12	HTR2A	C	T	-	-	noncoding	GE1169	CCGTGCCAGAGGAAGCC	CTCACCAAACCGAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagagggactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcatgtgtgaaccctgaagacaaatgtaagttctcatgccgctatatttattgctgtgtaatttcttttccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagttgtctgctaatctttacttaagactttttgtttcctttattagctaagcaacattataggagctgaaattcctgacagcagctgtggcaattcagc[c/t]taagaatggctgagaactgtaacccaaagatacatccaattactatgggattaacactggatgtattttaattgacttcttaatgtagaatgtgtacatccccactgtttctgattgcatgctatttaataatactgttgctaaactagtaccatcggcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaactttcttctttgtccagaacatttatcttccccgaacgctcaaaaaaaaccctgcaacctctatgctaaaagtttcattctgctttTTTGTCCTCGGTTTGGTGAG	749

FIG. 5AAAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Au 13	HTR2A	A	G	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtgaaccctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaattttctt tccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagt tgtctgctaatctttacttaagactttttgtttcctttattagctaagcaacattataggag ctgaaattcctgacagcagctgtggcaattcagcctaagaatggctgagaactgtaacccaaaga tacatccaattactatgggattaacactggatgtattttaattgactttcttaatgtagaatgt gtacatccccactgtttctgattgcatgctattttaataatactgttgctaaactagtaccatcg gcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaactttcttcttt gtccagaacatttatcttccccga[a/g]cgctcaaaaaaaccctgcaacctctatgctaaaag tttcattctgctttTTTGTCCTCGGTTTGGTGAG	749
HTR2Au 2	HTR2A	A	G	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgcc[a/g]gacactcacagcactccgag gacatactgttttctagccttatttatgttctctcttcacccttcagcctaaaaattaccacag tgccacttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagca aaggaaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Au 3	HTR2A	A	G	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtg[a/g]accctgaagacaaatgtaagttctcatgccgctatattttattgctgtgtaattt tctttccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggagga aagttgtctgctaatctttacttaagactttttgtttcctttattagctaagcaacattata ggagctgaaattcctgacagcagctgtggcaattcagcctaagaatggctgagaactgtaaccca aagatacatccaattactatgggattaacactggatgtattttaattgactttcttaatgtaga atgtgtacatccccactgtttctgattgcatgctattttaataatactgttgctaaactagtacc atcggcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaaactttcttt ctttgtccagaacatttatcttccccgaacgctcaaaaaaaccctgcaacctctatgctaaaag tttcattctgctttTTTGTCCTCGGTTTGGTGAG	749

FIG. 5BBBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Au 4	HTR2A	G	C	-	-	noncoding	GE1172	TGCAACCTCTA TGCTAAAAG	TGCTCTTTATT ACCAGTGCG	TGCAACCTCTATGCTAAAAGtttcattctgctttttgtcctcggtttggtgagaaaataataaa accaaacagtggactctcctaaaattgtgaatgaagaaaacttacagccaccacagttcagttct ttaactatcattgtaataatggaagacaaaaatccagccccgggagaacagcatgtacaccagcc tca[g/c]tgttacagagtgtgggtacatcaaggtgaatagtgagcagaaactataacctgttag tccttctacacctcatctgctacaagttctggcttagacatggatattctttgtgaagaaaatac ttctttgagctcaactacgaactccctaatgcaattaaatgatgacaccaggctctacagtaatg actttaactccggagaagctaacacttctgatgcatttaactggacagtcgactctgaaatcga accaacctttcctgtgaagggtgcctctcaccgtcgtgtctctccttacttcatctccaggaaaa aaactggtctgctttactgacagccgtagtgattattctaactattgctggaaacatactcgtca tcatggcagtgtccctagagaaaaagctgcagaatgccaccaactatttcctgatgtcacttgcc atagctgatatgctgctgggtttccttgtcatgcccgtgtccatgttaaccatcctgtatggtga gtggcattagtttcccagctatattCGCACTGGTAATAAAGAGCA	760
HTR2Au 5	HTR2A	C	T	S	S	cds	GE1172	TGCAACCTCTA TGCTAAAAG	TGCTCTTTATT ACCAGTGCG	TGCAACCTCTATGCTAAAAGtttcattctgctttttgtcctcggtttggtgagaaaataataaa accaaacagtggactctcctaaaattgtgaatgaagaaaacttacagccaccacagttcagttct ttaactatcattgtaataatggaagacaaaaatccagccccgggagaacagcatgtacaccagcc tcagtgttacagagtgtgggtacatcaaggtgaatagtgagcagaaactataacctgttagtcct tctacacctcatctgctacaagttctggcttagacatggatattctttgtgaagaaaatacttct ttgagctcaactacgaactccctaatgcaattaaatgatgacaccaggctctacagtaatgactt taactc[c/t]ggagaagctaacacttctgatgcatttaactggacagtcgactctgaaaatcga accaacctttcctgtgaagggtgcctctcaccgtcgtgtctctccttacttcatctccaggaaaa aaactggtctgctttactgacagccgtagtgattattctaactattgctggaaacatactcgtca tcatggcagtgtccctagagaaaaagctgcagaatgccaccaactatttcctgatgtcacttgcc atagctgatatgctgctgggtttccttgtcatgcccgtgtccatgttaaccatcctgtatggtga gtggcattagtttcccagctatattCGCACTGGTAATAAAGAGCA	760
HTR2Au 6	HTR2A	C	T	H	Y	cds	GE1176	TGTTTCATTTT CTGTTCAACTC C	TCACACACAGC TCACCTT	TGTTTCATTTTCTGTTCAACTCCaggtatatccatgccaataccagtctttgggctacaggacga ttcgaaggtctttaaggaggggagttgcttactcgccgatgataactttgtcctgatcggctctt ttgtgtcatttttcattcccttaaccatcatggtgatcacctactttctaactatcaagtcactc cagaaagaagctactttgtgtgtaagtgatcttggcacacgggccaaattagcttctttcagctt cctccctcagagttctttgtcttcagaaaagctcttccagcggtcgatccatagggagccagggt cctacacaggcaggaggactatgcagtccatcagcaatgagcaaaaggcatgcaaggtgctgggc atcgtcttcttcctgtttgtggtgatgtggtgccctttcttcatcacaaacatcatggccgtcat ctgcaaagagtcctgcaatgaggatgtcattggggccctgctcaatgtgtttgtttggatcggtt atctctcttcagcagtcaacccactagtctacacactgttcaacaagacctataggtcagccttt tcacggtatattcagtgtcagtacaaggaaaacaaaaaaccattgcagttaattttagtgaacac aataccggctttggcctacaagtctagccaacttcaaatgggacaaaaaaagaattcaaagcaag atgccaagacaacagataatgactgctcaatggttgctctaggaaagcag[c/t]attctgaaga ggcttctaaagacaatagcgacggagtgaatgaaAAGGTGAGCTGTGTGTGA	832

FIG. 5CCCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Au 7	HTR2A	A	G	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgaggaca tactgttttctagccttatttatgttctctcttcacccttcagcctaaaaattaccacagtgcc acttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagcaaagg aaaacttccc[a/g]atattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgc cctcctggctgttgctaccttgcagcttatgacatacacatagagggaggtctgatgaaatgaac gagacagtcagagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Au 8	HTR2A	A	G	-	-	noncoding	GE1167	TGGTACTGCGA AACCAA	CGCACTGCTAG GATCCTGTT	TGGTACTGCGAAACCAActtatttcctaccacatgtgaggttttgaataatatctgggtggcata tttctgctgaagaaaataagccagttcaatggtgtatctattaaataaaaatagtgctaatagtt tatcagagttatcaccacagactgcctagccaccctgagcctatgtggccaatgtcagtaattcc actctggacacaaacactgttggctttggatggaagtgccagacactcacagcactccgaggaca tactgttttctagccttatttatgttctctcttcacccttcagcctaaaaattaccacagtgcc acttacctaccttaatgggaatctgcacaaaaggccatttctccagtttctctcaaaagcaaagg aaaacttcccaatattaatatgtagcaaaaagagggagaagaaaaagcctgtttggtccgccctc ctggctgttgctaccttgcagcttatgacatacac[a/g]tagagggaggtctgatgaaatgaac gagacagtcayagagctactccattcccgtggaaaccaggagtcccttggtgcagacagctcttc ctactttcccatgcagttcttttgtgcgactttgaggggctcgtgaatgatttctaaatgtgtgc ctgctgaggcgagccgcacagggagggaggaacccagccgagccgtgccagaggaagccAACAGG ATCCTAGCAGTGCG	729
HTR2Au 9	HTR2A	G	A	-	-	noncoding	GE1169	CCGTGCCAGAG GAAGCC	CTCACCAAACC GAGGACAAA	CCGTGCCAGAGGAAGCCaacaggatcctagcagtgcggacgtggctcagctcttgcatgcagttt ttgaagtcagcaaaacagaaaccaaattactatcatattatgctggtggaagatcaagaagaggg gactctacaccagtttaattactgtgagagatgcagcgagtcacagaataacaaatgtatctcat gtgtgaaccctgaagacaaatgtaagttctcatgccgctatatttattgctgtgtaattttctt tccggtttgaaatcatgcttggccaacatgtaatcatttcaatgagaatttccagggaggaaagt tgtctgctaatctttacttaagactttttgttttcctttattagctaagcaacattataggag ctgaaattcctgacagcagctgtggcaattca[g/a]cctaagaatggctgagaactgtaaccca aagatacatccaattactatgggattaacactggatgtattttaattgactttcttaatgtaga atgtgtacatccccactgtttctgattgcatgctattttaataatactgttgctaaactagtacc atcggcataaccaacaaaatgagatatagttaaacaagagtcccagtagttataaactttcttt ctttgtccagaacatttatcttccccgaacgctcaaaaaaaccctgcaacctctatgctaaaag tttcattctgcttTTTGTCCTCGGTTTGGTGAG	749
HTR2Cu 1	HTR2C	G	C	C	S	cds	GE1126	TTTTTCAGTGT GCACCTAATTG	ACTTACCATAA AGGATTGCC	TTTTTCAGTGTGCACCTAATTGgcctattggtttggcaat[g/c]tgatatttctgtgagcccag tagcagctatagtaactgacattttcaatacctccgatggtggacgcttcaaattcccagacggg gtacaaaactggccagcactttcaatcgtcatcataataatcatgacaataggtggcaacatcct tgtgatcatggcagtaagcatggaaaagaaactgcacaatgccaccaattacttcttaatgtccc tagccattgctgatatgctagtgggactacttgtcatgcccctgtctctcctGGCAATCCTTTAT GGTAAGT	332

FIG. 5DDDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR2Cu 2	HTR2C	A	C	M	L	cds	GE1275	CCTAGATATTT GTGCCCCGT	CGATCAAACGC AAATGT	CCTAGATATTTGTGCCCCGTctggatttctttagatgttttattttcaacagcgtccatc(a/c) tgcacctctgcgctatatcgctggatcggtatgtagcaatacgtaatcctattgagcatagccgt ttcaattcgcggactaaggccatcatgaagattgctattgtttgggcaatttctataggtaaata aaactttttggccataagaattgcagcggctatgctcaatactttcggattatgtactgtgaaca acgtacagacgtcgactggtaACATTTGCGTTTGATCG	298
HTR2Cu 3	HTR2C	C	G	L	V	cds	GE993	CAAAAGAAAGG ATGATATGATG A	TTACAGGAATG AATGCACCG	CAAAAGAAAGGATGATATGATGAacctagcctgttaatttcgtcttctcaattttaaactttggt tgcttaagactgaagcaatcatggtgaac(c/g)tgaggaatgCGGTGCATTCATTCCTGTAA	128
HTR2Cu 4	HTR2C	C	G	I	M	cds	GE1275	CCTAGATATTT GTGCCCCGT	CGATCAAACGC AAATGT	CCTAGATATTTGTGCCCCGTctggatttctttagatgttttattttcaacagcgtccatcatgca cctctgcgctatatcgctggatcggtatgtagcaatacgtaatcctattgagcatagccgtttca attcgcggactaaggccat(c/g)atgaagattgctattgtttgggcaatttctataggtaaata aaactttttggccataagaattgcagcggctatgctcaatactttcggattatgtactgtgaaca acgtacagacgtcgactggtaACATTTGCGTTTGATCG	298
HTR5Au 1	HTR5A	T	C	H	H	cds	GE1319	TCTGCAAGTAC CCCAGG	GGATTGCTGAG ATACCCA	TCTGCAAGTACCCCAGGgcggtctcctgacccagagatggatttaccagtgaacctaacctcctt ttccctctccacccccctcccctttggagaccaaccacagcctcggcaaagacgacctgcgcccca gctcgcccctgctctcggtcttcggagtgcttattctcaccttgctgggctttctggtggcggcg acgttcgcctggaacctgctggtgctggcgaccatcctccgtgtacgcaccttccaccgcgtgcc ccacaacctggtggcatccatggccgtctcggatgtcctggtggccgcgctggtcatgccgctga gcctggtgca(t/c)gagctgtccgggcgccgctggcagctaggtcggaggctgtgccagctttg gatcgcgtgcgacgtgctttgctgcacggccagcatctggaacgtgacggccatagccctggacc gctactggtccatcacgcgccacatggaatacacgctccgcacccgcaagtgcgtctccaacgtc atgatcgcgctcacctgggcactctccgctgtcatctctctggccccgctgctttttggctgggg agagacgtactctgagggcagcgaggagtgccaggtaagccgcgagccttcctacgccgtgttct ccaccgtaggcgccttctacctgccgctctgtgtggtgctcttcgtgtactggaagatctacaag gctgccaagttccgcgtgggctccaggaagaccaatagcgtctcacccatatccgaagctgtgga ggTGGGTATCTCAGCAATCC	800
HTR5Au 2	HTR5A	A	T	P	P	cds	GE1319	TCTGCAAGTAC CCCAGG	GGATTGCTGAG ATACCCA	TCTGCAAGTACCCCAGGgcggtctcctgacccagagatggatttacc(a/t)gtgaacctaacct ccttttccctctccacccccctcccctttggagaccaaccacagcctcggcaaagacgacctgcgc cccagctcgcccctgctctcggtcttcggagtgcttattctcaccttgctgggctttctggtggc ggcgacgttcgcctggaacctgctggtgctggcgaccatcctccgtgtacgcaccttccaccgcg tgccccacaacctggtggcatccatggccgtctcggatgtcctggtggccgcgctggtcatgccg ctgagcctggtgcatgagctgtccgggcgccgctggcagctaggtcggaggctgtgccagctttg gatcgcgtgcgacgtgctttgctgcacggccagcatctggaacgtgacggccatagccctggacc gctactggtccatcacgcgccacatggaatacacgctccgcacccgcaagtgcgtctccaacgtc atgatcgcgctcacctgggcactctccgctgtcatctctctggccccgctgctttttggctgggg agagacgtactctgagggcagcgaggagtgccaggtaagccgcgagccttcctacgccgtgttct ccaccgtaggcgccttctacctgccgctctgtgtggtgctcttcgtgtactggaagatctacaag gctgccaagttccgcgtgggctccaggaagaccaatagcgtctcacccatatccgaagctgtgga ggTGGGTATCTCAGCAATCC	800

FIG. 5EEEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR5Au3	HTR5A	C	T	I	I	cds	GE1319	TCTGCAAGTACCCCAGG	GGATTGCTGAGATACCCA	TCTGCAAGTACCCCAGGgcggtctcctgacccagagatggatttaccagtgaacctaacctcctt ttccctctccacccccctccccttggagaccaaccacagcctcggcaaagacgacctgcgcccca gctcgcccctgctctcggtcttcggagtgcttattctcaccttgctgggctttctggtggcggcg acgttcgcctggaacctgctggtgctggcgaccatcctccgtgtacgcaccttccaccgcgtgcc ccacaacctggtggcatccatggccgtctcggatgtcctggtggccgcgctggtcatgccgctga gcctggtgcatgagctgtccgggcgccgctggcagctaggtcggaggctgtgccagctttggatc gcgtgcgacgtgctttgctgcacggccagcatctggaacgtgacggccatagccctggaccgcta ctggtccatcacgcgccacatggaatacacgctccgcacccgcaagtgcgtctccaacgtcatga tcgcgctcacctgggcactctccgctgtcat[c/t]tctctggccccgctgcttttggctgggg agagacgtactctgagggcagcgaggagtgccaggtaagccgcgagccttcctacgccgtgttct ccaccgtaggcgccttctacctgccgctctgtgtggtgctcttcgtgtactggaagatctacaag gctgccaagttccgcgtgggctccaggaagaccaatagcgtctcacccatatccgaagctgtgga ggTGGGTATCTCAGCAATCC	800
HTR6d5	HTR6	G	A	P	P	cds	GE1148	CCAGGCCGTGTGCGACT	AGGGTCTGGGTTCTGCTCA	CCAGGCCGTGTGCGACTgcatctccccaggcctcttcgatgtcctcacatggctgggttactgta acagcaccatgaaccccatcatctacccactcttcatgcgggacttcaagcgggcgctgggcagg ttcctgccatgtccacgctgtccccgggagcgccaggccagcctggcctcgccatcactgcgcac ctctcacagcggcccccggcccggccttagcctacagcaggtgctgccgctgcccctgccgccgg actcagattcggactcagacgcaggctcaggcggctcctcgggcctgcggctcacggcccagctg ctgcttcctggcgaggccacccaggacccccgctgcccaccagggccgctgccgccgtcaattt cttcaacatcgaccccgcggagcccgagctgcggcc[g/a]catccacttggcatccccacgaac tgacccgggcttggggctggccaatggggagctggatTGAGCAGAACCCAGACCCT	511
HTR6u1	HTR6	C	A	Q	K	cds	GE1148	CCAGGCCGTGTGCGACT	AGGGTCTGGGTTCTGCTCA	CCAGGCCGTGTGCGACTgcatctccccaggcctcttcgatgtcctcacatggctgggttactgta acagcaccatgaaccccatcatctacccactcttcatgcgggacttcaagcgggcgctgggcagg ttcctgccatgtccacgctgtccccgggagcgccaggccagcctggcctcgccatcactgcgcac ctctcacagcggcccccggcccggccttagccta[c/a]agcaggtgctgccgctgcccctgccg ccggactcagattcggactcagacgcaggctcaggcggctcctcgggcctgcggctcacggccca gctgctgcttcctggcgaggccacccaggacccccgctgcccaccagggccgctgccgccgtca atttcttcaacatcgaccccgcggagcccgagctgcggccgcatccacttggcatccccacgaac tgacccgggcttggggctggccaatggggagctggatTGAGCAGAACCCAGACCCT	511
HTR6u2	HTR6	G	T	A	A	cds	GE1316	GTTCTCACGGACGGTCCCC	CTCCGAGGCCTGACTGG	GTTCTCACGGACGGTCCCCgtccagcctgcgcttcgccggggccctcatctgctttcccgccacc ctatcactcccttgccgtccaccctcggtcctcatggtcccagagccgggcccaaccgccaatag caccccggcctgggggcagggccgccgtcggcccccgggggcagcggctgggtggcggccgcgc tgtgcgtggtcatcgcgctgacggcggc[g/t]gccaactcgctgctgatcgcgctcatctgcac tcagcccgcgctgcgcaacacgtccaacttcttcctggtgtcgctcttcacgtctgacctgatgg tggggctggtggtgatgccgccggccatgctgaacgcgctgtacgggcgctgggtgctggcgcgc ggcctctgcctgctctggaccgccttcgacgtgatgtgctgcagcgcctccatcctcaacctctg cctcatcagcctggaccgctacctgctcatcctctcgccgctgcgctacaagctgcgcatgacgc ccctgcgtgccctggccctagtcctgggcgcctggagcctcgccgctctcgcctccttcctgccc ctgctgctgggctggcacgagctgggccacgcacggccacccgtccctggccagtgccgcctgct ggccagcctgccttttgtccttgtggcgtcgggcctcaccttcttcctgccctcgggtgccatat gcttcacctactgcaggatcctgctagctgcccgcaagcaggccgtgcaggtggcctccctcacc accggcatggCCAGTCAGGCCTCGGAG	807

FIG. 5FFFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
HTR6u3	HTR6	C	A	P	T	cds	GE1148	CCAGGCCGTGTGCGACT	AGGGTCTGGGTTCTGCTCA	CCAGGCCGTGTGCGACTgcatctccccaggcctcttcgatgtcctcacatggctgggttactgtaacagcaccatgaaccccatcatctacccactcttcatgcgggacttcaagcgggcgctgggcaggttcctgccatgtccacgctgtccccgggagcgccaggccagcctggcctcgccatcactgcgcacctctcacagcggcccccggcccggccttagcctacagcaggtgctg[c/a]cgctgcccctgccgccggactcagattcggactcagacgcaggctcaggcggctcctcgggcctgcggctcacggcccagctgctgcttcctggcgaggccacccaggacccccgctgcccaccagggccgctgccgccgtcaatttcttcaacatcgaccccgcggagcccgagctgcggccgcatccacttggcatccccacgaactgacccgggcttggggctggccaatggggagctggatTGAGCAGAACCCAGACCCT	511
HTR6u4	HTR6	C	T	A	A	cds	GE1148	CCAGGCCGTGTGCGACT	AGGGTCTGGGTTCTGCTCA	CCAGGCCGTGTGCGACTgcatctccccaggcctcttcgatgtcctcacatggctgggttactgtaacagcaccatgaaccccatcatctacccactcttcatgcgggacttcaagcgggcgctgggcaggttcctgccatgtccacgctgtccccgggagcgccaggccagcctggcctcgccatcactgcgcacctctcacagcggcccccggcccggccttagcctacagcaggtgctgccgctgcccctgccgccggactcagattcggactcagacgcaggctcaggcggctcctcgggcctgcggctcacggcccagctgctgcttcctggcgaggccacccaggacccccgctgcccaccagggccgctgccgc[c/t]gtcaatttcttcaacatcgaccccgcggagcccgagctgcggccgcatccacttggcatccccacgaactgacccgggcttggggctggccaatggggagctggatTGAGCAGAACCCAGACCCT	511
HTR7d1	HTR7	T	C	L	P	cds	GE1178	TTGCTTGGTTGACCAGTTATG	AGTGATAAATGACCTTACAGCA	TTGCTTGGTTGACCAGTTATGatcacggtgttcatctgttatctttccatctctccactaggtaccttgggatcacaaggcccctcacataccctgtgaggcagaatgggaaatgcatggcgaagatgattctctccgtctggcttctctccgcctccatcaccttacctccactctttggatgggctcagaatgtaaatgatgataaggtgtgcttgatcagccaggactttggctatacgatttactctaccgcagtggcatttatatccccatgtccgtcatgcttttcatgtactaccagatttacaaggctgccaggaagagtgctgccaaacacaagtttcctggcttccctcgagtggagccagacagcgtcatcgccctgaatggcatagtgaagctccagaaggaggtggaagagtgtgcaaacctttcgagactcctcaagcatgaaaggaaaaacatctccatctttaagcgagaacagaaagcagccaccaccctggggatcatcgtcggggcctttaccgtgtgctggctgccattttcctcctctcgacagccagacccttcatctgtggcacttcctgcagctgcatcccactgtgggtggagaggacatttctgtggctaggctatgcaaactctctcattaaccctttatatatgccttcttcaaccgggacctgaggaccacctatcgcagcctgctccagtgccagtaccggaatatcaaccggaagctctcagctgcaggcatgcatgaagccctgaagc[t/c]tgctgagaggccagagagacctgagtttgTGCTGTAAGGTCATTTATCACT	839
IGF1d35	IGF1	A	G	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaagtagtgtactgttcaccaaattgtgaatttgggggtgcaggggcaggagttggaaatttttaaagttagaaggctccattgtttgttggctctcaaacttagcaaaattagcaatatattatcca[a/g]tcttctgaacttgatcaagagcatggagaataaacgcgggaaaaagatcttataggcaatagaagaatttaaaagataagtaagttccttattgattttgtgcactctgctctaaaacagatattcagcaagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgccaaantcccccntggggaatccttggcaatttactggtttatagaagacattctcccttcacccagacatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaagtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaagagatggctaacaatctgtgaagatttttgtttcttggtttgtttttttttttttttactttatacagtctttatgaatttcttaatgttcaaaatgacttggttctttttcttctttttttatatcagaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaatgtatgtttgacttgttgaagctataatcagactatttaaaatgttttgctattttttaatcttaaaagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccattcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972

FIG. 5GGGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1d36	IGF1	C	T	C	C	cds	GE591	GAAAGCAGATTGCACCCTAAC	CCACCCAGGTGGGCTTA	GAAAGCAGATTGCACCCTAACatgaggccactctgtttgatttgtgcagacaagcccacagggtatggctccagcagtcggagggcgcctcagacaggcatcgtggatgagtg[c/t]tgcttccggagctgtgatctaaggaggctggagatgtattgcgcacccctcaagcctgccaagtcagctcgctctgtccgtgcccagcgccacaccgacatgcccaagacccagaaggTAAGCCCACCTGGGTGG	253
IGF1d37	IGF1	C	T	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactctttgttag[c/t]actcactgactcttctatgcagttactacatatctagtaaaaccttgtttaatactataaataatattctattcattttgaaaaacacaatgattccttcttttctaggcaatataaggaaagtgatccaaaatttgaaatattaaaataatatctaataaaagtcacaaagttatcttctttaacaaactttactcttattcttagctgtatatacatttttttaaaagtttgttaaaatatgctgactagagtttcagttgaaaggcaaaaacttccatcacaacaagaaatttcccatgcctgctcagaagggtagcccctagctctctgtgaatgtgtttatccattcaactgaaaattggtatcaagaaagtccactggttagtgtactagtccatcatagcctagaaaatgatccctatctgcagatcaagatttctcATTAGAACAATGAATTATCCAGC	807
IGF1u1	IGF1	C	A	A	D	cds	GE638	GGAACCACTTGTTCTCAATGC	TTTCCGTTTTCTCCATGTTTC	GGAACCACTTGTTCTCAATGCaattattttgtgatgtttacagtatcagcccccatctaccaacaagaacacgaagtctcagagaaggaaaggttggccaaagacacatccaggaggggaacagaaggaggggacagaagcaagtctgcagatcagaggaaagaagaaagagcagaggagggagattggaagtagaaatg[c/a]tgaatgcagaggcaaaaaaggaaaatgaaggacaggaggattaaacagacagaggcaaggatgatgagagaggagcagacagcaagaatgaaaagcagaaaatacaatagaggaaatgaagaaaagtaggcctgctggagctagatgatgatgtgatggaaatagaagtaacctttttagagaatctcgctaaGAAACATGGAGAAAACGGAAA	419
IGF1u10	IGF1	A	G	-	-	noncoding	GE688	TCATAGCCTAGAAAATGATCCCTAT	AGGGTTTGCATCAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagatttctcattagaacaatgaattatccagcattcagatctttctagtcaccttagaacttttggttaaaagtacccaggcttgattatttcatgcaaattctatatttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagtttttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaagactccctggatctctgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtatttaactctcagtccaacattatttgaattgagcacctcaagcatgcttagcaatgttctaatcactatggacagatgtaaaagaaactatacatcattttgccctctgcctgttttccagacatacaggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtccccagtgtgtaccttttaaaattattccctctcaacaaactttataggcagtcttctgcagacttaac[a/g]tgttttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcacttaattctatccacagtcaaaaatcccccaaggaggaaagctgaaagatgcaactgccaatattatctttcttaactttttccaacacataatcctctccaactggattataaataaattgaaaataactcattataccaattcactatttttattttttaatgaattaaaactagaAAACAAATTGATGCAAACCCT	847

FIG. 5HHHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGFlul 1	IGF1	T	G	-	-	noncoding	GE682	CCAACACATAATCCTCTCCAACT	CACATTGGCATAGCTGGC	CCAACACATAATCCTCTCCAACTggattataaataaattgaaaataactcattataccaattcactattttatttttaatgaattaaaactagaaaacaaattgatgcaaaccctggaagtcagttgat[t/g]actatatactacagcagaatgactcagatttcatagaaaggagcaaccaaaatgtcacaaccaaaactttacaagctttgcttcagaattagattgctttataattcttgaatgaggcaatttcaagatatttgtaaaagaacagtaaacattggtaagaatgagctttcaactcataggcttatttccaatttaattgaccatactggatacttaggtcaaatttctgttctctcttgcccaaataatattaaagtattatttgaacttttaagatgaggcagttcccctgaaaagttaatgcagctctccatcagaatccactcttctagggatatgaaaatctcttaacacccaccctacatacacagacacacacacacacacacacacacacacacacacattcaccctaaggatccaatggaatactgaaaagaaatcacttccttgaaaatttattaaaaacaaacaaacaaacaaaaagcctgtccacccttgagaatccttcctctccttggaacgtcaatgtttgtgtagatgaaaccatctcatgctctgtggctccagggtttctgttactattttatgcacttgggagaaggcttagaataaaagatgtagcacatttgctttcccatttattgtttgGCCAGCTATGCCAATGTG	815
IGFlul 2	IGF1	T	C	-	-	noncoding	GE683	TTTTATATTACTGAGGCCTAAAAGT	AGATATACCATTTTATTATGACACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttattttgcccaaaatgcactgatgtaaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcaccaactcatagcaaagtcacttctgttaatcccttaatctgatttgtttggatatttatcttgtacccgctgctaaacacactgcaggagggactctgaaacctcaagctgtctacttacatctttatctgtgtctgtgtatcatgaaaatgtctattcaaaatatcaaaacctttcaaatatcacgcagcttatattcagtttacataaaggccccaaataccatgtcagatcttttggtaaaagagttaatgaactatgagaattgggattacatcatgtatttgcctcatgtatttttatcacacttataggccaagtg[t/c]gataaataaacttacagacactgaattaatttcccctgctactttgaaaccagaaataatgactggccattcgttacatctgtcttagttgaaaagcatatttttattaaattaattctgattgtatttgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaatgtaactaattgaatcattatcttacatttactgtttaataagcatatttgaaaatgtatggctAGAGTGTCATAATAAAATGGTATATCT	741
IGFlul 3	IGF1	G	A	G	E	cds	GE642	AAAAATGCTTCTGTGCTCTAGT	GAATTCCCCAATGACTTCAA	AAAAATGCTTCTGTGCTCTAGTtttaaaatgcaaaggtatgatgttatttgtcaccatgcccaaaaaagtccttactcaataactttgccagaagagggagagagagagaaggcaaatgttcccccagctgtttcctgtctacagtgtctgtgttttgtagataaatgtgaggatttctctaaatccctcttctgtttgctaaatctcactgtcactgctaaattcagagcagantagagcctgcgcaatggaataaagtcctcaaaattgaaatgtgacattgctctcaacatctcccatctctctggatttcttttttgcttcattattcctgctaaccaattcattttcagactttgtacttcagaagcaatgg[g/a]aaaaatcagcagtcttccaacccaattatttaagtgctgcttttgtgatttcttgaaggtaaatatttcttactctTTGAAGTCATTGGGGAATTC	478

FIG. 5IIIIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGFlul 4	IGF1	T	G	-	-	noncoding	GE688	TCATAGCCTAG AAAATGATCCC TAT	AGGGTTTGCAT CAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagatttctcattagaacaatgaattatcc agcattcagatctttctagtcaccttagaactttttggttaaaagtacccaggcttgattatttc atgcaaa[t/g]tctatatttacattcttggaaagtctatatgaaaaacaaaaataacatcttc agtttttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaagactccctgga tctctgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaag tattttaactctcagtccaacattatttgaattgagcacctcaagcatgcttagcaatgttctaa tcactatggacagatgtaaaagaaactatacatcattttgccctctgcctgttttccagacata caggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtc cccagtgtgtacctttaaaattattccctctcaacaaaactttataggcagtcttctgcagact taacatgtttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcac ttaattctatccacagtcaaaaatcccccaaggaggaaagctgaaagatgcaactgccaatatta tctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataact cattataccaattcactatttatttttaatgaattaaaactagaAAACAAATTGATGCAAACC CT	847
IGFlul 5	IGF1	T	G	-	-	noncoding	GE688	TCATAGCCTAG AAAATGATCCC TAT	AGGGTTTGCAT CAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagatttctcattagaacaatgaattatcc agcattcagatctttctagtcaccttagaactttttggttaaaagtacccaggcttgattatttc atgcaaattctatatttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagtt tttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaagactccctggatctc tgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtatt ttaactctcagtccaacattatttgaattgagcacctcaagca[t/g]gcttagcaatgttctaa tcactatggacagatgtaaaagaaactatacatcattttgccctctgcctgttttccagacata caggttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtc cccagtgtgtacctttaaaattattccctctcaacaaaactttataggcagtcttctgcagact taacatgtttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcac ttaattctatccacagtcaaaaatcccccaaggaggaaagctgaaagatgcaactgccaatatta tctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataact cattataccaattcactatttatttttaatgaattaaaactagaAAACAAATTGATGCAAACC CT	847
IGFlul 6	IGF1	T	C	-	-	noncoding	GE688	TCATAGCCTAG AAAATGATCCC TAT	AGGGTTTGCAT CAATTTGTTT	TCATAGCCTAGAAAATGATCCCTATctgcagatcaagatttctcattagaacaatgaattatcc agcattcagatctttctagtcaccttagaactttttggttaaaagtacccaggcttgattatttc atgcaaattctatatttacattcttggaaagtctatatgaaaaacaaaaataacatcttcagtt tttctcccactgggtcacctcaaggatcagaggccaggaaaaaaaaaaagactccctggatctc tgaatatatgcaaaaagaaggccccatttagtggagccagcaatcctgttcagtcaacaagtatt ttaactctcagtccaacattatttgaattgagcacctcaagcatgcttagcaatgttctaatcac tatggacagatgtaaaagaaactatacatcattttgccctctgcctgttttccagacatacagg ttctgtggaataagatactggactcctcttcccaagatggcacttctttttatttcttgtcccca g[t/c]gtgtacctttaaaattattccctctcaacaaaactttataggcagtcttctgcagact taacatgtttctgtcatagttagatgtgataattctaagagtgtctatgacttatttccttcac ttaattctatccacagtcaaaaatcccccaaggaggaaagctgaaagatgcaactgccaatatta tctttcttaacttttccaacacataatcctctccaactggattataaataaattgaaaataact cattataccaattcactatttatttttaatgaattaaaactagaAAACAAATTGATGCAAACC CT	847

FIG. 5JJJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1ul7	IGF1	A	T	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaagtagtgtactgttcaccaaattgtgaatttggggtgcaggggcaggagttggaaatttttaaagttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatattatccaatcttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaagaatttaaaagataagtaagttccttattgattttgtgcactctgctctaaaacagatattcagcaagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgccaaantcccccntggggaatccttggcaatttactggtttatagaagacattctcccttcacccagacatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaagtatttccttatgagatggggttatctactgataaagaaagaatttatgagaaattgttgaaagagatggctaacaatctgtgaagattttttgtttcttggtttgtttttttttttttttttacttt[a/t]tacagtctttatgaatttcttaatgttcaaaatgacttggttcttttcttctttttttatatcagaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaatgtatgtttgacttgttgaagctataatcagactatttaaaatgttttgctatttttaatcttaaaagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccattcaaatcacatggctttccaccaatatttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1ul8	IGF1	G	A	-	-	noncoding	GE683	TTTTATATTACTGAGGCCTAAAAGT	AGATATACCATTTTATTATGACACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttattttgcccaaaatgcactgatgtaaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcaccaactcatagcaaagtcacttctgttaatcccttaatctgatttgtttggatatttatcttgtacccgctgctaaacacactgcaggagggactctgaaacctcaa[g/a]ctgtctacttacatcttttatctgtgtctgtgtatcatgaaaatgtctattcaaaatatcaaacctttcaaatatcacgcagcttatattcagtttacataaaggccccaaataccatgtcagatcttttggtaaaagagttaatgaactatgagaattgggattacatcatgtatttgcctcatgtattttatcacacttataggccaagtgtgataaataaacttacagacactgaattaattcccctgctactttgaaaccagaaaataatgactggccattcgttacatctgtcttagttgaaaagcatatttttattaaattaattctgattgtatttgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaatgtaactaattgaatcattatcttacatttactgtttaataagcatattttgaaaatgtatggctAGAGTGTCATAATAAAATGGTATATCT	741
IGF1ul9	IGF1	C	G	-	-	noncoding	GE1191	TTTATAGGAAGTACATTTGAAGAAC	ACAAACTACAAAATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgtaggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagttacctgttaaactttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttccccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaaatggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaaagaaaaaaaaatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgtatagatccagttgcactaaatt[c/g]ctctctgaatcttggctgctggagccattcattcagcaccttgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgtttgttttacagtgtctgataatcttgttagtctatacccaccacctcccttcataacctttatatttgccgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaagattccatctgtggcatttgtaccaaatataagttggatgcattttattttagacacaaagctttatttttccacatcatgcttacaaaaagaataatgcaaatagttgcaactttgaggccaatcattttaggcatatgtttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatgagttaatgtgcaacctaattagtaactttcctcttttttattttttccatatagagcactatgtaaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttttagtataATGGTGCTATTTTGTAGTTTGT	993

FIG. 5KKKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u2	IGF1	G	A	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaa[g/a]ctaacagctcaatctcttaaaacacttttcaaaatatgtgggaagcatttgatttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactctttgttagcactcactgactcttctatgcagttactacatatctagtaaaaccttgtttaatactataaataatattctattcatttgaaaaacacaatgattccttcttttctaggcaatataaggaaagtgatccaaaatttgaaatattaaaataatatctaataaaaagtcacaaagttatcttctttaacaaactttactcttattcttagctgtatatacatttttttaaaaagtttgttaaaatatgcttgactagagtttcagttgaaaggcaaaaacttccatcacaacaagaaatttcccatgcctgctcagaagggtagcccctagctctctgtgaatgtgttttatccattcaactgaaaattggtatcaagaaagtccactggttagtgtactagtccatcatagcctagaaaatgatccctatctgcagatcaagattttctcATTAGAACAATGAATTATCCAGC	807
IGF1u20	IGF1	T	G	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactctt[t/g]gttagcactcactgactcttctatgcagttactacatatctagtaaaaccttgtttaatactataaataatattctattcatttgaaaaacacaatgattccttcttttctaggcaatataaggaaagtgatccaaaatttgaaatattaaaataatatctaataaaaagtcacaaagttatcttctttaacaaactttactcttattcttagctgtatatacatttttttaaaaagtttgttaaaatatgcttgactagagtttcagttgaaaggcaaaaacttccatcacaacaagaaatttcccatgcctgctcagaagggtagcccctagctctctgtgaatgtgttttatccattcaactgaaaattggtatcaagaaagtccactggttagtgtactagtccatcatagcctagaaaatgatccctatctgcagatcaagattttctcATTAGAACAATGAATTATCCAGC	807
IGF1u21	IGF1	T	C	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATAAAATGAGTAATGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcccttattatttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaattaaaggaacctcactgaaaacatatatttcacgtgttccctctctttttttcctttttgtgagatggggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacctcctgggtt[t/c]aagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccactatgcccggctaatttttggattttaatagagacggggttttaccatgttggccaggttggactcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggcatgagccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgatccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttttttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgagttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatgaccttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTCATTTTATTTTGCCCAA	796

FIG. 5LLLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u2 2	IGF1	T	A	-	-	noncoding	GE1191	TTTATAGGAAG TACATTTGAAG AAC	ACAAACTACAA AATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgt aggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagtt acctgttaaactttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttc ccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaa atggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaaagaaaaaa aaatatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgt atagatccagttgcactaaattcctctctgaatcttggctgctggagccattcattcagcaacct tgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgtttgt tttacagtgtctgataatcttgttagtctatacccaccacctcccttcataacctttatatttgc cgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaaga ttccatctgtggcatttgtaccaaa[t/a]ataagttggatgcattttattttagacacaaagct ttattttccacatcatgcttacaaaaaagaataatgcaaatagttgcaactttgaggccaatca tttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatga gttaatgtgcaacctaattagtaactttcctcttttatttttccatatagagcactatgtaaa tttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttagtataATGG TGCTATTTTGTAGTTTGT	993
IGF1u2 3	IGF1	T	C	-	-	noncoding	GE1191	TTTATAGGAAG TACATTTGAAG AAC	ACAAACTACAA AATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgt aggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagtt acctgttaaactttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttc ccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaa atggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaaagaaaaaa aaatatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgt atagatccagttgcactaaattcctctctgaatcttggctgctggagccattcattcagcaacct tgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgtttgt tttacagtgtctgataatcttgttagtctatacccaccacctcccttcataacctttatatttgc cgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaaga ttccatctgtggcatttgtaccaaatataagttggatgcattttattttagacacaaagctttat tttccacatcatgcttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcatttt taggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatga[t/c]ga gttaatgtgcaacctaattagtaactttcctcttttatttttccatatagagcactatgtaaa tttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttagtataATGG TGCTATTTTGTAGTTTGT	993
IGF1u2 4	IGF1	T	G	-	-	noncoding	GE683	TTTTATATTAC TGAGGCCTAAA AGT	AGATATACCAT TTTATTATGAC ACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttatttgcccaaaatgcactgatgt aaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcacc aactcatagcaaagtcacttctgttaatcccttaatctgatttgtttggatatttatcttgtac ccgctgctaaacacactgcaggagggactctgaaacctcaagctgtctacttacatcttttatct gtgtctgtgtatcatgaaaatgtctattcaaaatatcaaaacctttcaaatatcacgcagcttat attcagtttacataaaggccccaaataccatgtcagatcttttggtaaaagagttaatgaacta tgagaattgggattacatcatgtattttgcctcatgtattttatcacacttataggccaagtgt gataaataaacttacagacactgaattaatttcccctgctactttgaaaccagaaaataatgact ggccattcgttacatctgtcttagttgaaaagcatatttttattaaattaattctgattgtatt tgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaaatgtaa ctaattgaatcatta[t/g]cttacatttactgtttaataagcatatttgaaaatgtatggctA GAGTGTCATAATAAAATGGTATATCT	741

FIG. 5MMMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u25	IGF1	T	C	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaa gtagtgtactgttcaccaaattgtgaatttggggtgcaggggcaggagttggaaatttttaaa gttagaaggctccattgtttgttggctctcaaacttagcaaattagcaatatattatccaatc ttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaag aatttaaaagataagtaagttccttattgattttgtgcactctgctctaaaacagatattcagc aagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgcc aaantcccccntggggaatccttggcaatttactggtttatagaagacattctcccttcacccag acatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaa gtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaag agatggctaacaatctgtgaagatttttgtttcttggtttgtttttttttttttttttacttt atacagtctttatgaatttcttaatgttcaaaatgacttggttctttcttcttttttttatatc agaatgaggaataataagttaaacccacatagactctttaaaacta[t/c]aggctagatagaaa tgtatgtttgacttgttgaagctataatcagactatttaaaatgtttgctattttaatcttaa aagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccat tcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u26	IGF1	G	A	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATAAAATGAGTAATGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcc cttattatttagtatctgcctcagaatttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctcttttttttcctttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttggatttttaatagagacggggtttaccatgttggccaggttggac tcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggcatgag ccaccacaccctgcccatgtgttccctcttaatgtat[g/a]attacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u27	IGF1	T	G	-	-	noncoding	GE682	CCAACACATAATCCTCTCCAACT	CACATTGGCATAGCTGGC	CCAACACATAATCCTCTCCAACTggattataaataaattgaaaataactcattataccaattcac tattttatttttaatgaattaaaactagaaaacaaattgatgcaaaccctggaagtcagttgat tactatatactacagcagaatgactcagatttcatagaaaggagcaaccaaaatgtcacaaccaa aactttacaagctttgcttcagaattagattgctttataattcttgaatgaggcaatttcaagat atttgtaaaagaacagtaaacattggtaagaatgagctttcaactcataggcttatttccaattt aattgaccatactggatacttaggtcaaatttctgttctctcttgcccaaataatattaaagtat ta[t/g]ttgaacttttaagatgaggcagttcccctgaaaaagttaatgcagctctccatcaga atccactcttctagggatatgaaaatctcttaacacccaccctacatacacagacacacacacac acacacacacacacacacacacacacattcaccctaaggatccaatggaatactgaaaagaaa tcacttccttgaaaatttattaaaaaacaaacaaacaaacaaaaagcctgtccacccttgagaa tccttcctctccttggaacgtcaatgtttgtgtagatgaaaccatctcatgctctgtggctccag ggtttctgttactattttatgcacttgggagaaggcttagaataaaagatgtagcacattttgct ttcccatttattgtttgGCCAGCTATGCCAATGTG	815

FIG. 5NNNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u28	IGF1	T	G	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaagtagtgtactgttcaccaaattgtgaatttgggggtgcaggggcaggagttggaaatttttaaagttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatat[t/g]atccaatcttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaagaatttaaaagataagtaagttccttattgattttgtgcactctgctctaaaacagatattcagcaagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgccaaantccccntggggaatccttggcaatttactggtttatagaagacattctcccttcacccagacatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaagtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaagagatggctaacaatctgtgaagatttttgttcttggtttgttttttttttttttttactttatacagtctttatgaatttcttaatgttcaaaatgacttggttcttttcttcttttttttatatcagaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaatgtatgtttgacttgttgaagctataatcagactatttaaaatgtttgctattttaatcttaaaagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccattcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u29	IGF1	G	C	-	-	noncoding	GE1192	GGCTTAATAAAATAGCATTAGGT	GATGCCATTGCATAAATCAGA	GGCTTAATAAAATAGCATTAGGTctatctagccaccaccacctttcaacttttatcactcacaagtagtgtactgttcaccaaattgtgaatttgggggtgcaggggcaggagttggaaatttttaaagttagaaggctccattgttttgttggctctcaaacttagcaaaattagcaatatattatccaatcttctgaacttgatcaagagcatggagaataaacgcgggaaaaaagatcttataggcaaatagaagaatttaaaagataagtaagttccttattgattttgtgcactctgctctaaaacagatattcagcaagtggagaaaataagaacaaagagaaaaaatacatagatttacctgcaaaaaatagcttctgccaaantccccntggggaatccttggcaatttactggtttatagaagacattctcccttcacccagacatctcaaagagcagtagctctcatgaaaagcaatcactgatctcatttgggaaatgttggaaagtatttccttatgagatgggggttatctactgataaagaaagaatttatgagaaattgttgaaagagatggctaacaatctgtgaagatttttgtttcttggtttgtttttttttttttttttactttatacagtctttatgaatttcttaatgttcaaaatgacttggttcttttcttcttttttttatatcagaatgaggaataataagttaaacccacatagactctttaaaactataggctagatagaaat[g/c]tatgtttgacttgttgaagctataatcagactatttaaaatgtttgctattttaatcttaaaagattgtgctaatttattagagcagaacctgtttggctctcctcagaagaaagaatctttccattcaaatcacatggctttccaccaatattttcaaaagataaaTCTGATTTATGCAATGGCATC	972
IGF1u3	IGF1	T	C	-	-	noncoding	GE1326	GCTTTATTTTTCCACATCATGC	CCTAGAAAAGAAGGAATCATTG	GCTTTATTTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcattttaggcatatgtttaaacatagaaagttcttcaactcaaaagagttccttcaaatgatgagttaatgtgcaacctaattagtaactttcctcttttattttttccatatagagcactatgtaaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttagtataatggtgctatttgtagtttgttatatgaaagagtctggccaaaacggtaatacgtgaaagcaaaacaataggggaagcctggagccaaagatgacacaaggggaagggtactgaaaacaccatccatttgggaaagaaggcaaagtccccccagttatgccttccaagaggaacttcagacacaaaagtccactgatgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggctaggaatttagcagtcctggtttctttttctcatggaagaaatgaacatctgccagctgtgtcatggactcaccactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgcaaatgggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagattcagatttttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaa	1196

FIG. 500000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u30	IGF1	G	T	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATAAAATGAGTAATGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcccttattatttagtatctgcctcagaatttatagagggctgaccaagctgaaactctagaattaaaggaacctcactgaaaacatatatttcacgtgttccctctctttttttcctttttgtgagatggggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacctcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccactatgcccggctaatttttggattttaatagagacggggtttaccatgttggccaggttggactcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggcatgagccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgatccttctctcctcattcttcaactatctttgatggggtctttcaagg[g/t]gaaaaaaatccaagcttttttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgagttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatgaccttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTCATTTTATTTTGCCCAA	796
IGF1u31	IGF1	A	T	-	-	noncoding	GE1191	TTTATAGGAAGTACATTTGAAGAAC	ACAAACTACAAAATAGCACCAT	TTTATAGGAAGTACATTTGAAGAACgcaagtagagggagtgcaggaaacaagaactacaggatgtaggaagaccctcctgaggagtgaagagtgacatgccaccgcaggatcctttgctctgcacgagttacctgttaaactttggaacacctaccaaaaaataagtttgataacatttaaaagatgggcgtttcccccaatgaaatacacaagtaaacattccaacattgtctttaggagtgatttgcaccttgcaaaaatggtcctggagttggtagattgctgttgatcttttatcaataatgttctatagaaagaaaaaaaaatatatatatatatatatcttagtccctgcctctcaagagccacaaatgcatgggtgttgtatagatccagttgcactaaattcctctctgaatcttggctgctggagccattcattcagcaacctgtctaagtggtttatgaattgtttccttatttgcacttctttctacacaactcgggctgtttgttttacagtgtctgataatcttgttagtctatacccaccacctcccttcataaccttatatttgccgaatttggcctcctcaaaagcagcagcaagtcgtcaagaagcacaccaattctaacccacaagattccatctgtggcatttgtaccaaatataagttggatgcattttattttagacacaaagctttattttccacatcatgcttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcattttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatgagttaatgtgcaacctaattagtaactttcctctttttatttttccatatagagcactatgtaaattt[a/t]gcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttagtataATGGTGCTATTTTGTAGTTTGT	993
IGF1u32	IGF1	G	T	-	-	noncoding	GE1326	GCTTTATTTTCCACATCATGC	CCTAGAAAAGAAGGAATCATTG	GCTTTATTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcattttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatgagttaatgtgcaacctaattagtaactttcctctttttatttttccatatagagcactatgtaaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttagtataatggtgctattttgtagtttgttatatgaaagagtctggccaaaacggtaatacgtgaaagcaaaacaataggggaagcctggagccaaagatgacacaaggggaagggtactgaaaacaccatccatttgggaaagaaggcaaagtcccccagttatgccttccaagaggaacttcagacacaaaagtccactgatgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggcta[g/t]gaattttagcagtcctggtttctttttctcatggaagaaatgaacatctgccagctgtgtcatggactcaccactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgcaaaatgggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagattcagatttttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacactttcaaaatatgtgggaagcatttgatttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaa	1196

FIG. 5PPPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u3 3	IGF1	T	A	-	-	noncoding	GE1326	GCTTTATTTTTCCACATCATGC	CCTAGAAAAGAAGGAATCATTG	GCTTTATTTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaa tcattttaggcatatgtttaaacatagaaagtttcttcaactcaaaagagttccttcaaatga tgagttaatgtgcaacctaattagtaactttcctctttttatttttttccatatagagcactatgt aaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttttagtataa tggtgctattttgtagtttgttatatgaaagagtctggccaaaacggtaatacgtgaaagcaaaa caataggggaagcctggagccaaagatgacacaaggggaagggtactgaaaacaccatccatttg ggaaagaaggcaaagtccccccagttatgccttccaagaggaacttcagacacaaaagtccactg atgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggctaggaat tttagcagtcctggtttctttttctcatggaagaaatgaaca[t/a]ctgccagctgtgtcatgg actcaccactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgca aaatgggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagat tcagatttttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgc aaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgaca tctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctc aatctcttaaaacacttttcaaaatatgtgggaagcatttgattttcaatttgattttgaattct gcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaa	1196
IGF1u3 4	IGF1	T	G	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATAAAATGAGTAATGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcc cttattatttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctcttttttttccttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttggattttaatagagacggggttttaccatgttggccaggttggac tcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggcatgag ccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgatcctt ctctcctcattcttcaactatctttgatggggtc[t/g]ttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u4	IGF1	T	G	-	-	noncoding	GE676	AGATAAGACAGAGGCCCAGG	TTGGGCAAAATAAAATGAGTAATGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcc cttattatttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatata[t/g]ttcacgtgttccctctcttttttttccttttgtga gatggggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctc cacctcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcaccca ccactatgcccggctaatttttggattttaatagagacggggttttaccatgttggccaggtt ggactcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggca tgagccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796

FIG. 5QQQQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u5	IGF1	A	T	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcc cttattatttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctctttttttttcctttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttttggatttttaatagagacggggttttaccatgttggccaggttgg[a /t]ctcaaactcctgaccttgtgatttgcccgcctcagcctcccaaattgctgggattacaggca tgagccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u6	IGF1	T	G	-	-	noncoding	GE676	AGATAAGACAG AGGCCCAGG	TTGGGCAAAAT AAAATGAGTAA TGT	AGATAAGACAGAGGCCCAGGggattttgaagctgtctttattctgcccccatcccaacccagcc cttattatttagtatctgcctcagaattttatagagggctgaccaagctgaaactctagaatta aaggaacctcactgaaaacatatatttcacgtgttccctctctttttttttcctttttgtgagatg gggtctcgcactgtcccccaggctggagtgcagtggcatgatctcggctcactgcaacctccacc tcctgggtttaagcgattctcctgcctcagcctcctgagtagctgggattacaggcacccaccac tatgcccggctaatttttttggatttttaatagagacggggttttaccatgttggccaggttggac tcaaactcctgaccttgtgatttgcccgcctcagcctcccaaa[t/g]tgctgggattacaggca tgagccaccacaccctgcccatgtgttccctcttaatgtatgattacatggatcttaaacatgat ccttctctcctcattcttcaactatctttgatggggtctttcaaggggaaaaaaatccaagcttt tttaaagtaaaaaaaaaaaaagagaggacacaaaaccaaatgttactgctcaactgaaatatgag ttaagatggagacagagtttctcctaataaccggagctgaattacctttcactttcaaaaacatg accttccacaatccttagaatctgcctttttttatattactgaggcctaaaagtaaACATTACTC ATTTTATTTTGCCCAA	796
IGF1u7	IGF1	C	T	-	-	noncoding	GE683	TTTTATATTAC TGAGGCCTAAA AGT	AGATATACCAT TTTATTATGAC ACTCT	TTTTATATTACTGAGGCCTAAAAGTaaacattactcattttattttgcccaaaatgcactgatgt aaagtaggaaaaataaaaacagagctctaaaatccctttcaagccacccattgaccccactcacc aactcatagcaaagtcacttctgttaatcccttaatctgatttgtttggatatttatcttgtac ccgctgctaaacacactgcaggagggactctgaaacctcaagctgtctacttacatcttttatct gtgtctgtgtatcatgaaaatgtctattcaaaatatcaaaacctttcaaatatcacgcagcttat attcagtttacataaaggccccaaataccatgtcagatctttttggtaaaagagttaatgaacta tgagaattgggattacatcatgtatttgcctcatgtatttttatcacacttataggccaagtgt gataaataaacttacagacactgaattaatttcccctgctactttgaaaccagaaataatgact ggccatt[c/t]gttacatctgtcttagttgaaaagcatatttttttattaaattaattctgattg tatttgaaattattattcaattcacttatggcagaggaatatcaatcctaatgacttctaaaaat gtaactaattgaatcattatcttacatttactgtttaataagcatatttgaaaatgtatggctA GAGTGTCATAATAAAATGGTATATCT	741

FIG. 5RRRRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF1u8	IGF1	T	A	-	-	noncoding	GE1326	GCTTTATTTTTCCACATCATGC	CCTAGAAAAGAAGGAATCATTG	GCTTTATTTTTCCACATCATGCttacaaaaaagaataatgcaaatagttgcaactttgaggccaatcatttttaggcatatgttttaaacatagaaagtttcttcaactcaaaagagttccttcaaatgatgagttaatgtgcaacctaattagtaactttcctctttttatttttccatatagagcactatgtaaatttagcatatcaattatacaggatatatcaaacagtatgtaaaactctgtttttagtataatggtgctattttgtagtttgtta[t/a]atgaaagagtctggccaaaacggtaatacgtgaaagcaaaacaataggggaagcctggagccaaagatgacacaaggggaagggtactgaaacaccatccatttgggaaagaaggcaaagtccccccagttatgccttccaagaggaacttcagacacaaaagtccactgatgcaaattggactggcgagtccagagaggaaactgtggaatggaaaaagcagaaggctaggaattttagcagtcctggtttctttttctcatggaagaaatgaacatctgccagctgtgtcatggactcaccactgtgtgaccttgggcaagtcacttcacctctctgtgcctcagtttcctcatctgcaaaatgggggcaatatgtcatctacctacctcaaaggggtggtataaggtttaaaaagataaagattcagatttttttaccctgggttgctgtaagggtgcaacatcagggcgcttgagttgctgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacactttcaaaatatgtgggaagcatttgattttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaa	1196
IGF1u9	IGF1	A	T	-	-	noncoding	GE678	AGGGCGCTTGAGTTGCT	GCTGGATAATTCATTGTTCTAAT	AGGGCGCTTGAGTTGCTgagatgcaaggaattctataaataacccattcatagcatagctagagattggtgaattgaatgctcctgacatctcagttcttgtcagtgaagctatccaaataactggccaactagttgttaaaagctaacagctcaatctcttaaaacactttcaaaatatgtgggaagcatttgattttcaatttgattttgaattctgcatttggttttatgaatacaaagataagtgaaaagagagaaaggaaaagaaaaaggagaaaaacaaagagatttctaccagtgaaaggggaattaattactctttgttagcactcactgactcttctatgcagttactacatatctagtaaaaccttgtttaatactataaataatattctattcattttgaaaaacacaatgattccttcttttctaggcaatataaggaaagtgatccaaaatttgaaatattaaaataatatctaataaaagtcacaaagttatcttctttaacaaactttactcttattcttagctgtatatacattttttt[a/t]aaaagtttgttaaaatatgcttgactagagtttcagttgaaaggcaaaaacttccatcacaacaagaaatttcccatgcctgctcagaagggtagcccctagctctctgtgaatgtgttttatccattcaactgaaaattggtatcaagaaagtccactggttagtgtactagtccatcatagcctagaaaatgatccctatctgcagatcaagatttttctcATTAGAACAATGAATTATCCAGC	807
IGF2a2	IGF2	C	T	-	-	noncoding	GE689	GGAAGAGCGTGGAGAGCA	CCAATTGTTTCTCAGCCAAT	GGAAGAGCGTGGAGAGCAggcacctgctgaccagccccttcccctcccaggacaacttccccagataccccgtgggcaagttcttccaatatgacacctggaagcagtccacccagcgcctgcgcaggggcctgcctgccctcctgcgtgcccgccggggtcacgtgctcgccaaggagctcgaggcgttcagggaggccaaacgtcaccgtcccctgattgctctacccacccaagaccccgcccacgggggcgccccccagagatggccagcaatcggaagtgagcaaaactgccgcaagtctgcagcccgg[c/t]gccaccatcctgcagcctcctcctgaccacggacgtttccatcaggttccatcccgaaatctctcggttccacgtcccctggggcttctcctgacccagtccccgtgccccgcctccccgaaacaggctactctcctcggccccctccatcgggctgaggaagcacagcagcatcttcaaacatgtacaaaatcgattggctttaaacacccttcacataccctcccccaaattatccccaattatccccacacataaaaatcaaaacattaaactaaccccttcccccccccccacaacaaccctcttaaaactaattggcttttagaaacaccccacaaaagctcagaaattggctttaaaaaaacaaccaccaaaaaaaatcaattggctaaaaaaaaaaagtattaaaaacgaATTGGCTGAGAAACAATTGG	763

FIG. 5SSSSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
IGF2u1	IGF2	A	G	-	-	noncoding	GE689	GGAAGAGCGTGGAGAGCA	CCAATTGTTTCTCAGCCAAT	GGAAGAGCGTGGAGAGCAggcacctgctgaccagccccttcccctcccaggacaacttccccagataccccgtgggcaagttcttccaatatgacacctggaagcagtccacccagcgcctgcgcaggggcctgcctgccctcctgcgtgcccgccggggtcacgtgctcgccaaggagctcgaggcgttcagggaggccaaacgtcaccgtcccctgattgctctacccacccaagaccccgcccacgggggcgccccccagagatggccagcaatcggaagtgagcaaaactgccgcaagtctgcagcccggcgccaccatcctgcagcctcctcctgaccacggacgtttccatcaggttccatcccgaaaatctctcggttccacgtcccctggggcttctcctgacccagtccccgtgccccgcctccccgaaacaggctactctcctcggccccctcc[a/g]tcgggctgaggaagcacagcagcatcttcaaacatgtacaaatcgattggctttaaacacccttcacataccctcccccaaattatccccaattatccccacacataaaaatcaaaacattaaactaaccccttccccccccccacaacaaccctcttaaaactaattggcttttagaaacaccccacaaaagctcagaaattggctttaaaaaaacaaccaccaaaaaaaatcaattggctaaaaaaaaaaagtattaaaaacgaATTGGCTGAGAAACAATTGG	763
KLK2d1	KLK2	T	A	-	-	noncoding	GE478	GGGCCAAAGAACCAGGTG	CCAGAATTAGGGTCTTCACTCA	GGGCCAAAGAACCAGGTGggtccggccacagcccag[t/a]ttttctctgacccatagtcttgcgccccaggagtcttcagtgtgtgagcctccatctcctgtccaatgacatgtgtgctagagcttactctgagaaggtgacagagttcatgttgtgtgctgggctctggacaggtggtaaagacacttgtggggtgagtcatccctactcccaacatctggaggggaaaggTGAGTGAAGACCCTAATTCTGG	256
KLK2d2	KLK2	A	G	-	-	noncoding	GE478	GGGCCAAAGAACCAGGTG	CCAGAATTAGGGTCTTCACTCA	GGGCCAAAGAACCAGGTGggtccggccacagcccagttttctctgaccc[a/g]tagtcttgcgccccaggagtcttcagtgtgtgagcctccatctcctgtccaatgacatgtgtgctagagcttactctgagaaggtgacagagttcatgttgtgtgctgggctctggacaggtggtaaagacacttgtggggtgagtcatccctactcccaacatctggaggggaaaggTGAGTGAAGACCCTAATTCTGG	256
KLK2d3	KLK2	G	C	V	L	cds	GE484	CCCTCCCCTATCCAATTCTTT	GCTGTTATTCCTGTGGGACAC	CCCTCCCCTATCCAATTCTTTtgggtctgatccccctgacccagcacccccctccgcaggtgcc[g/c]tgcccctcatccagtctcggattgtgggaggctgggagtgtgagaagcattcccaaccctggcaggtggctgtgtacagtcatggatgggcacactgtgggggtgtcctggtgcacccccagtgggtgctcacagctgcccattgcctaaagaagtaagtaggaccctgggatctggggagggaatggctGTGTCCCACAGGAATAACAGC	279
LIPCd25	LIPC	C	T	-	-	noncoding	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcc[c/t]gctgctgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcctgggtgcacacgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCd26	LIPC	C	A	T	T	cds	GE335	CACTTCAATAAGCTCCACCTAAA	TCAGTTTATGAGAGTGAAACATACCC	CACTTCAATAAGCTCCACCTAAAacttaaggctgtgtttgcttcctgttttctattcagaatgacatttgttcagaaaacacagatgacctactacttcgcccaac[c/a]caggaaaaaatcttcgtgaaatgtgaaataaagtctaaaacatcaaagcgaaagatcagatgagatttaatgaagacccagtgtaaagaataaatgaatcttactccttatctggaatggctgccttatttagaagccaaaattacataaagaatctcacacaaagcttaaataaagtttagatttaagggGGGTATGTTTCACTCTCATAAACTGA	329
LIPCd27	LIPC	C	T	-	-	noncoding	GE335	CACTTCAATAAGCTCCACCTAAA	TCAGTTTATGAGAGTGAAACATACCC	CACTTCAATAAGCTCCACCTAAAacttaaggctgtgtttgcttcctgttttctattcagaatgacatttgttcagaaaacacagatgacctactacttcgcccaacccaggaaaaaatcttcgtgaaatgtgaaataaagtctaaaacatcaaagcgaaagatcagatgagatttaatgaagacccagtgtaaagaataaatgaatcttactccttatctggaatggctgc[c/t]ttatttagaagccaaaattacataaagaatctcacacaaagcttaaataaagtttagatttaagggGGGTATGTTTCACTCTCATAAACTGA	329

FIG. 5TTTTTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCd2 8	LIPC	G	A	-	-	noncoding	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgc[g/a]gggagaaagggaaactaaggcgaccctccctctgtcc cctcctcaggtggacggcgtgctagaaaactggatctggcagatggtggccgcgctgaagtctca gccggcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacacca tcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggta ccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCd2 9	LIPC	C	T	-	-	noncoding	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgta ttcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgggaaa acagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagggccg cgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggtgact gctgattcaatctcctattaa[c/t]gtccatTAAGCACCCACTTGTGCCA	311
LIPCu1	LIPC	G	A	V	M	cds	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcggggagaaagggaaactaaggcgaccctccctctgtcccctc ctcaggtggacggc[g/a]tgctagaaaactggatctggcagatggtggccgcgctgaagtctca gccggcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacacca tcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggta ccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCu1 0	LIPC	A	T	Q	L	cds	GE374	TGAGAACCAAG TGATCCTCTGA	ATCCTGCATCC TGCCCTTC	TGAGAACCAAGTGATCCTCTGAgttgaggctgctttggcgtaaggggtgataacgtccttcttgc cctgtgttccagccatcacccagaccataaaatgctcccacgagcgatcggtgcacctttttcatc gactccttgctgcacgccggcacgc[a/t]gagcatggcctacccgtgtggtgacatgaacagct tcagccagggcctgtgcctgagctgcaagaagggccgctgcaacacgctgggctaccacgtccgc caggagccgcggagcaagagcaagaggctcttcctcgtaacgcgagcccagtccccccttcaaagg tgagtgtggagctggggagccttcaGAAGGGCAGGATGCAGGAT	369
LIPCu1 1	LIPC	T	A	N	K	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaa[t/a]aaaa cgtattcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgg gaaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagg gccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggt gactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu1 2	LIPC	G	A	S	N	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgta ttcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgggaaa acagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatgga[g/a]cacagg gccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggt gactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu1 3	LIPC	G	A	P	P	cds	GE346	GCTGGAGAAGG AAGAAGGGTA	TCACTCTCAGA GGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcggggagaaagggaaactaaggcgaccctccctctgtcccctc ctcaggtggacggcgtgctagaaaactggatctggcagatggtggccgcgctgaagtctcagcc[g/a]gcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacacca tcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggta ccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCu1 4	LIPC	T	G	I	M	cds	GE475	AACTGATTGTG TCTGATTTTCT	TGGCACAAGTG GGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaat[t/g]gctagtaataaaa cgtattcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgg gaaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagg gccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggt gactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311

FIG. 5UUUUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCu15	LIPC	G	C	G	A	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgccaatttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctg[g/c]ctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu16	LIPC	A	T	M	L	cds	GE374	TGAGAACCAAGTGATCCTCTGA	ATCCTGCATCCTGCCCTTC	TGAGAACCAAGTGATCCTCTGAgttgaggctgctttggcgtaaggggtgataacgtccttcttgccctgtgttccagccatcacccagaccataaaatgctcccacgagcgatcggtgcaccttttcatcgactccttgctgcacgccggcacgcagagc[a/t]tggcctacccgtgtggtgacatgaacagcttcagccagggcctgtgcctgagctgcaagaagggccgctgcaacacgctgggctaccacgtccgccaggagccgcggagcaagagcaagaggctcttcctcgtaacgcgagcccagtccccccttcaaaggtgagtgtggagctggggagccttcaGAAGGGCAGGATGCAGGAT	369
LIPCu17	LIPC	G	A	E	K	cds	GE475	AACTGATTGTGTCTGATTTTCT	TGGCACAAGTGGGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgtattcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgg[g/a]aaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagggccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagcaaaggtgactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu18	LIPC	G	T	A	S	cds	GE346	GCTGGAGAAGGAAGAAGGGTA	TCACTCTCAGAGGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcggggagaaagggaaactaaggcgaccctccctctgtcccctcctcaggtggacggcgtgctagaaaactggatctggcagatggtggccgcgctgaagtctcagccggcccagccagtgaacgtggggctggtggactggatcaccctggcccacgaccactacaccatcgccgtccgcaacacccgccttgtgggcaaggaggtc[g/t]cggctcttctccggtggctggaggtaccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCu19	LIPC	C	A	-	-	noncoding	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgcttt[c/a]ccattagggctggatgccgcgggacctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgccaatttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu2	LIPC	T	A	V	E	cds	GE346	GCTGGAGAAGGAAGAAGGGTA	TCACTCTCAGAGGAAGGGAAA	GCTGGAGAAGGAAGAAGGGTAgcggggagaaagggaaactaaggcgaccctccctctgtcccctcctcaggtggacggcgtgctagaaaactggatctggcagatggtggccgcgctgaagtctcagccggcccagccag[t/a]gaacgtggggctggtggactggatcaccctggcccacgaccactacaccatcgccgtccgcaacacccgccttgtgggcaaggaggtcgcggctcttctccggtggctggaggtaccgacctgccccagtccttccttcacctcccttccctccTTTCCCTTCCTCTGAGAGTGA	320
LIPCu20	LIPC	A	T	I	F	cds	GE300	TGGGCAGTCTTCCCTAACAA	ACCCCTGGATTCTTTGTGAC	TGGGCAGTCTTCCCTAACAAagtatctaataggcattgtggtctctttggcttcagaaattaccaagaaagcctggaccccgggtgaaacggagaaatggacacaagtcccctgtgtttctccattctgttggttttatgcatcttt[a/t]tccaatcaagtgcccttggacaaagcctgaaaccaggtaagagcctgacttttctccagagatgggcatgaactttctttttaaaacgtgtGTCACAAAGAATCCAGGGGT	264
LIPCu21	LIPC	A	C	H	P	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgcccccatcccgctgctgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcctgggtgcac[a/c]cgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220

FIG. 5VVVVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCu22	LIPC	T	A	M	K	cds	GE353	AGCAGCCTTTGAGAAGACG	TCACCAGCTCCCTATCTTTTTAT	AGCAGCCTTTGAGAAGACGgagggcttcagatgaagcagatgccaggctaagcaccgtccccaatcttatattgcagagccatttggaagaagagctcaagctgttgaaacaaacaaaacgctgcatgaga[t/a]gaagaccagattcctgctctttggagaaaccaatcagggctgtcagattcgaatcaatcatccggacacgttacaggagtgcggcttcaactcctccctgcctctggtgatgataatccacgggtggtcggtaggaaatgctgacatgccgtttttctctccgatttcactagcgtgttcatgttcATAAAAAGATAGGGAGCTGGTGA	345
LIPCu23	LIPC	G	C	G	A	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcccgctgctgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcctgggtgcacacgtgtcaggatttgccg[g/c]cagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCu24	LIPC	A	T	Q	L	cds	GE475	AACTGATTGTGTCTGATTTTCT	TGGCACAAGTGGGTGCTTA	AACTGATTGTGTCTGATTTTCTttgtgtattcaaggggcaaaggaattgctagtaataaaacgtattcctttcttatcacgctggatgtggatatcggcgagctgatcatgatcaagttcaagtgggaaaacagtgcagtgtgggccaatgtctgggacacggtccagaccatcatcccatggagcacagggccgcgccactcaggcctcgttctgaagacgatcagagtcaaagcaggagaaacccagc[a/t]aaggtgactgctgattcaatctcctattaacgtccatTAAGCACCCACTTGTGCCA	311
LIPCu3	LIPC	T	G	V	V	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcccgctgctgtcttccaggaatctgt[t/g]caactctctcgaagccatgttcacctaattgggtacagcctgggtgcacacgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCu4	LIPC	T	A	L	Q	cds	GE253	CACACTGGACCGCAAAAGG	AGTGTGTGAGTTATTAGGCATGG	CACACTGGACCGCAAAAGGctttcatccaggcagctcttctcctgccccccatcccgctgctgtcttccaggaatctgttcaactctctcgaagccatgttcacctaattgggtacagcc[t/a]gggtgcacacgtgtcaggatttgccggcagttccatcggtggaacgcacaagattgggagaatcacaggtaaCCATGCCTAATAACTCACACACT	220
LIPCu5	LIPC	A	G	G	G	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcggg[a/g]cctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgccaatttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu6	LIPC	A	G	N	S	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgcca[a/g]ttttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu7	LIPC	T	G	N	K	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgccaa[t/g]tttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
LIPCu8	LIPC	C	G	T	T	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgccaatttgtggatgccattcatacctttac[c/g]cgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcctggctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295

FIG. 5WWWWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
LIPCu9	LIPC	G	T	G	C	cds	GE323	CTCCCGCGTAACCCTTACC	CGGCCCATGACTTCATTCTC	CTCCCGCGTAACCCTTACCcctgctttcccattagggctggatgccgcgggacctttgtttgagggaagtgcccccagcaatcgtctttctccagatgatgccaatttgtggatgccattcatacctttacccgggagcacatgggcctgagcgtgggcatcaaacagcccataggacactatgacttctatcccaacgggggctccttccagcct[g/t]gctgccacttcctagagctctacagacatattgcccagcacggcttcaatggtGAGAATGAAGTCATGGGCCG	295
MAOAu1	MAOA	G	T	R	R	cds	GE1028	AGTGCAAATACGTAATTAATGC	AGCAGCCTACCCTTCTTC	AGTGCAAATACGTAATTAATGCgatccctccgaccttgactgccaagattcacttcagaccagagcttccagcagagagaaaccagttaattcagcg[g/t]cttccaatgggagctgtcattaagtgcatgatgtattacaaggaggccttctggaaGAAGAAGGGTAGGCTGCT	176
MAOAu2	MAOA	A	C	R	R	cds	GE984	GGGGAAAACATATCCATTT	ATTTACCTCCTTCCCCAT	GGGGAAAACATATCCATTTcggggcgcctttccaccagtatggaatcccattgcatatttggattacaataatctgtgg[a/c]ggacaatagataacATGGGGAAGGAGGTAAAT	116
MAOBu1	MAOB	T	G	V	V	cds	GE1010	AAAACAGAACCAAAAGGTTAAA	TGATCTTACCTTTACATGGTGGA	AAAACAGAACCAAAAGGTTAAAtatgtggaccttggaggatcctatgt[t/g]ggaccaacccagaatcgtatcttgagattagccaaggagctaggattggagacctacaaagtgaatgaggttgagcgtctgaTCCACCATGTAAAGGTAAGATCA	158
MAOBu2	MAOB	C	T	T	T	cds	GE1010	AAAACAGAACCAAAAGGTTAAA	TGATCTTACCTTTACATGGTGGA	AAAACAGAACCAAAAGGTTAAAtatgtggaccttggaggatcctatgttggaccaacccagaatcgtatcttgagattagccaaggagctaggattggagac[c/t]tacaaagtgaatgaggttgagcgtctgaTCCACCATGTAAAGGTAAGATCA	158
MAOBu3	MAOB	C	T	P	P	cds	GE1068	TGAACCTAGGATGTCCCTG	CCCAAACTCATATCCCAAATACA	TGAACCTAGGATGTCCCTGcacagcccatcaccaccacctttttggagagacatttgcc[c/t]tccgtgccaggcctgctcaggctgattggattgaccaccatctttcagcaacggctcttggcttcctggcccacaaagggggctacttgtgagagtctaaagagagagggtgtctgtaatcacactctcttcttacTGTATTTGGGATATGAGTTTGGG	225
MAOBu4	MAOB	A	G	K	K	cds	GE964	TTTAGATTTATCCTGGCCCAC	TGTACCTTTCCTCTTTGGTAA	TTTAGATTTATCCTGGCCCACaaagccagaaa[a/g]ctggcacgtcTTACCAAAGAGGAAAGGTACA	68
MAOBu5	MAOB	A	G	E	E	cds	GE985	ATCTTGCAGCCAGTGCAT	TCTACCTTCCATATTGAGTCAGG	ATCTTGCAGCCAGTGCATtatgaaga[a/g]aagaactggtgtgaggagcagtactctggggctgctacacaacttatttccccccctgggatCCTGACTCAATATGGAAGGTAGA	116
MPLd14	MPL	G	A	-	-	noncoding	GE485	CTGTACAGTCCAGCCCCTCC	GGTAGGGAAGTTCACAGAGAAGTC	CTGTACAGTCCAGCCCCTCCtcccacaggatctgctttaatccagc[g/a]cctctcctcatctctcccagcccaaggccacagtctcagatacctgtgaagaagtggaacccagcctccttgaaatcctccccaagtcctcagagaggactcctttgcccctgtgttcctcccaggcccagatggactaccgaagattgcagccttcttgcctggggaccatgcccctgtctgtgtgcccacccatggctgagtcagggtcctgctgtaccacccacattgccaaccattcctacctaccactaagctattggcagcagccttgaggacaggctcctcactcccagttccctggacagagctaaactctcgaGACTTCTCTGTGAACTTCCCTACC	397
MPLd15	MPL	G	A	P	P	cds	GE929	CTGGTCCCCTCCCCTTC	CTGGAGTGGGACTCAGC	CTGGTCCCCTCCCCTTCcacataaacatgcctgggaggacccagggccaactcaccagctgttccttagatgtctccttgctggcatcagactcagagcccctgaagtgtttctcccgaacatttgaggacctcacttgcttctgggatgaggaagaggcagcgcccagtgggacataccagctgctgtatgcctaccc[g/a]cggtaggtgctggactgtgccccactccccatgtatctgtccctgcacttaGCTGAGTCCCACTCCAG	272
MPLd16	MPL	G	A	V	M	cds	GE917	AGAAGTTGGGCATGGGC	GATTCCGGGAGCTGGAC	AGAAGTTGGGCATGGGCccaggtctgggtcctcaggcgtccgcatggtggctgtgtaggagggacctcttctatgccaacagggagaagccccgtgcttgccccctgagttcccagagcatgccccacttttggaacccgatacgtgtgccagtttccagaccaggaggaagtgcgtctcttctttccgctgcacctctgggtgaagaat[g/a]tgttcctaaaccagactcggactcagcgagtcctctttgtggacagtgtaggtaagagccatcctcctgtcaccctgccccctccacttgctgcccccaGTCCAGCTCCCGGAATC	330

FIG. 5XXXXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
MPLu1	MPL	C	T	A	V	cds	GE929	CTGGTCCCCTCCCCTTC	CTGGAGTGGGACTCAGC	CTGGTCCCCTCCCCTTCcacataaacatgcctgggaggacccagggccaactcaccagctgttccttagatgtctccttgctggcatcagactcagagcccctgaagtgtttctcccgaacatttgaggacctcacttgcttctgggatgaggaagaggcag[c/t]gcccagtgggacataccagctgctgtatgcctacccgcggtaggtgctggactgtgccccactccccatgtatctgtccctgcacttaGCTGAGTCCCACTCCAG	272
MPLu10	MPL	A	G	T	A	cds	GE491	AGAGGCTGAGCCATAGACTGT	TGGGGCAAGATTGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgccggctcccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgggaggagccagctccagaaatcagtgatttcctgaggtacgaactccgctatggccccagagatcccaagaactcc[a/g]ctggtcccacggtcatacagctgattgccacagaaacctgctgccctgctctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctggcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctcttatctcCTACCTTCAATCTTGCCCCA	417
MPLu11	MPL	A	T	D	V	cds	GE490	GGGTTGGAGGCTCTCTCAG	CAGGCTTCCCTAGAGATATTCTTTTA	GGGTTGGAGGCTCTCTCAGctgacaggcagacctagattgtgaagctgggatttcctcccaaggcttcagctctgacagcagagggtggaagctgcctcatctcaggactccagcctggcaactcctactggctgcagctgcgcagcgaacctg[a/t]tgggatctccctcggtggctcctggggatcctggtccctccctgtgactgtggacctgcctggagatgcaggtgagtcaacaaaggaatagggagatggggaggagaTAAAAGAATATCTCTAGGGAAGCCTG	293
MPLu12	MPL	C	A	A	A	cds	GE482	CTCTGGTGGCACAATGCCT	CCAGGGATCCCCTGCGTA	CTCTGGTGGCACAATGCCTtgtgcacagaaggacttaagctgctccctgctgacatccctgtagtgcgcctccccaccccaaacttgcactggagggagatctccagtgggcatctggaattggagtggcagcacccatcgtcctgggcagc[c/a]caagagacctgttatcaactccgatacacaggagaaggccatcaggactggaaggtatggtcaagcaacaaatgcccacagacctcacTACGCAGGGGATCCCTGG	263
MPLu13	MPL	T	A	L	Q	cds	GE450	CTCCCTGCCAATCCACTG	AAGGATCCAGTACCAGGCAG	CTCCCTGCCAATCCACTGccatggctcagtctgcttctcttccttctcccccaggagactgaggcatgccctgtggccctcacttccagacctgcaccgggtcc[t/a]aggccagtaccttagggacactgcagccctgagcccggtgagtgtgcttccctcccctgtgcccaccaccaaccCTGCCTGGTACTGGATCCTT	203
MPLu2	MPL	C	A	P	Q	cds	GE491	AGAGGCTGAGCCATAGACTGT	TGGGGCAAGATTGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgccggctcccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgggaggagc[c/a]agctccagaaatcagtgatttcctgaggtacgaactccgctatggccccagagatcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgctctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctggcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctcttatctcCTACCTTCAATCTTGCCCCA	417
MPLu3	MPL	T	A	L	H	cds	GE491	AGAGGCTGAGCCATAGACTGT	TGGGGCAAGATTGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgccggctcccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgggaggagccagctccagaaatcagtgatttcctgaggtacgaac[t/a]ccgctatggccccagagatcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgctctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctggcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctcttatctcCTACCTTCAATCTTGCCCCA	417

FIG. 5YYYYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
MPLu4	MPL	C	G	L	V	cds	GE482	CTCTGGTGGCACAATGCCT	CCAGGGATCCCCTGCGTA	CTCTGGTGGCACAATGCCTtgtgcacagaaggacttaagctgctccctgctgacatccctgtagtgcgcctccccaccccaaacttgcactggagggagatctccagtgggcat[c/g]tggaattggagtggcagcacccatcgtcctgggcagcccaagagacctgttatcaactccgatacacaggagaaggccatcaggactggaaggtatggtcaagcaacaaatgcccacagacctcacTACGCAGGGGATCCCTGG	263
MPLu5	MPL	G	A	E	K	cds	GE491	AGAGGCTGAGCCATAGACTGT	TGGGGCAAGATTGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgccggctcccccccagtatcatcaaggccatgggtgggagccagccaggggaacttcagatcagctgggaggagccagctccagaaatcagtgatttcctgaggtac[g/a]aactccgctatggccccagagatcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgctctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctggcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctcttatctcCTACCTTCAATCTTGCCCCA	417
MPLu6	MPL	C	A	R	R	cds	GE490	GGGTTGGAGGCTCTCTCAG	CAGGCTTCCCTAGAGATATTCTTTTA	GGGTTGGAGGCTCTCTCAGctgacaggcagacctagattgtgaagctgggatttcctcccaaggcttcagctctgacagcagagggtggaagctgcctcatctcaggactccagcctggcaactcctactggctgcagctgcg[c/a]agcgaacctgatgggatctccctcggtggctcctggggatcctggtccctccctgtgactgtggacctgcctggagatgcaggtgagtcaacaaaggaatagggagatggggaggagaTAAAAGAATATCTCTAGGGAAGCCTG	293
MPLu7	MPL	T	C	F	S	cds	GE472	ACGTGGGGCTGTATCTGACA	CAGGGCTCCCTCTTCCTG	ACGTGGGGCTGTATCTGACAggaacctgaggggctggcctgggaggggattggggcccagcttcctgaagggaggatgggctaaggcaggcacacagtggcggagaagatgccctcctgggccctct[t/c]catggtcacctcctgcctcctcctggcccctcaaaacctggcccaagtcagcagccaaggtgaggtgcacagagggtggagatcacctatgcccCAGGAAGAGGGAGCCCTG	244
MPLu8	MPL	C	T	S	S	cds	GE472	ACGTGGGGCTGTATCTGACA	CAGGGCTCCCTCTTCCTG	ACGTGGGGCTGTATCTGACAggaacctgaggggctggcctgggaggggattggggcccagcttcctgaagggaggatgggctaaggcaggcacacagtggcggagaagatgccctcctgggccctcttcatggtcacctc[c/t]tgcctcctcctggcccctcaaaacctggcccaagtcagcagccaaggtgaggtgcacagagggtggagatcacctatgcccCAGGAAGAGGGAGCCCTG	244
MPLu9	MPL	G	A	G	G	cds	GE491	AGAGGCTGAGCCATAGACTGT	TGGGGCAAGATTGAAGGTAG	AGAGGCTGAGCCATAGACTGTggtactcagagttctgatgtgccctgtcttgccctcaggcctgccggctcccccccagtatcatcaaggccatgggtgg[g/a]agccagccaggggaacttcagatcagctgggaggagccagctccagaaatcagtgatttcctgaggtacgaactccgctatggccccagagatcccaagaactccactggtcccacggtcatacagctgattgccacagaaacctgctgccctgctctgcagaggcctcactcagcctctgctctggaccagtctccatgtgctcagcccacaatgccctggcaagatggaccaaagcagacctccccaagtagagaagtatgctgaccttcttctgccccacctcttatctcCTACCTTCAATCTTGCCCCA	417

FIG. 5ZZZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBd9	NGFB	G	A	A	A	cds	GE1185	CACATCCATACTGCCTGAGT	AGGGGCCCAGGAGAGTG	CACATCCATACTGCCTGAGTcagccccgggttacgcctgttgtcccggtataaccattgctagcacacccttccctctcagaagtgccccggtttgaatgaaacctcttcgtgatccccttggaggtcaactctgagggacccagaaactgccttttgactgcatttagtactccatgaagtcaccctcatttcttttcattccaggtgcatagcgtaatgtccatgttgttctacactctgatcacagcttttctgatcggcatacaggc[g/a]gaaccacactcagagagcaatgtccctgcaggacacaccatccccaagtccactggactaaacttcagcattcccttgacactgcccttcgcagagcccgcagcgccccggcagcggcgatagctgcacgcgtggcggggcagacccgcaacattactgtggaccccaggctgtttaaaaagcggcgactccgttcaccccgtgtgctgtttagcacccagcctccccgtgaagctgcagacactcaggatctggacttcgaggtcggtggtgctgccccctcaacaggactcacaggagcaagcggtcatcatcccatcccatcttccacaggggcgaattctcggtgtgtgacagtgtcagcgtgtgggttggggataagaccaccgccacagacatcaagggcaaggaggtgatggtgttgggagaggtgaacattaacaacagtgtattcaaacagtactttttgagaccaagtgccgggacccaaatcccgttgacagcgggtgccggggcattgactcaaagcactggaactcatattgtaccacgactcacacctttgtcaaggcgctgaccatggatggcaagcaggctgcctggcggtttatccggatagatacggcctgtgtgtgtgtgctcagcaggaaggctgtgagaagagcctgacctgccgacacgctccctcccctgccccttctaCACTCTCCTGGGCCCCe	1001
NGFBu1	NGFB	G	C	-	-	noncoding	GE1186	TTTACAGAGGAGCTGACGTTTG	GACAACAGGCGTAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagtgagaggccctccaggagcagaactaattccacaattacttgaccaagttgggggattatttgtggg[g/c]taactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatctatagtcacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggagggagaaaagaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttctggttcagttttcatttgtgacttcagtgctttagtgttagttcattttctgtgaatcagtttccttatatgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtgaacacattttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggtagcgtctgaagaggtgcctggactaagatggtcccagagccacaaggttttgccaaacatgacgctttgtgaattcataacaagggctccaagtcaccagatcttagagctgacccagtgcactgtctgaaagggggtaccagttctgaggcttcaagacatgtccccagcagatcttccccgtgccttcccagaggattcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagaggtgttaaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaagcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaaatttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctgagtcagcccCGGGTTACGCCTGTTGTC	1002

FIG. 5AAAAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBu2	NGFB	A	G	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaattccacaattacttgaccaagttgggggattatttgtgg ggtaactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatctatagt cacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggagggagaaa agaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttctggt tcagttttcatttgtgacttcagtgctttagtgttagttcattttctgtgaatcagtttccttat atgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtgaacac attttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggtagcgt ctgaagaggtgcctggactaagatggtcccagagccacaaggttttgccaaacatgacgctttg tgaattcataacaagggctcc[a/g]agtcaccagatcttagagctgacccagtgcactgtctga aagggggtaccagttctgaggcttcaagacatgtccccagcagatcttccccgtgccttcccaga ggattcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagaggtgtt aaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaa gcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaa atttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctg agtcagcccCGGGTTACGCCTGTTGTC	1002
NGFBu3	NGFB	G	T	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaattccacaattacttgaccaagttgggggattatttgtgg ggtaactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatctatagt cacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggagggagaaa agaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttctggt tcagttttcatttgtgacttcagtgctttagtgttagttcattttctgtgaatcagtttccttat atgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtgaacac attttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggtagcgt ctgaagaggtgcctggactaagatggtcccagagccacaaggttttgccaaacatgacgctttg tgaattcataacaagggctccaagtcaccagatcttagagctgacccagtgcactgtctgaaag[g/t]gggtaccagttctgaggcttcaagacatgtccccagcagatcttccccgtgccttcccaga ggattcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagaggtgtt aaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaa gcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaa atttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctg agtcagcccCGGGTTACGCCTGTTGTC	1002

FIG. 5BBBBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBu4	NGFB	G	A	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaattccacaattacttgaccaagttggggattatttgtgg ggtaactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatctatagt cacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggagggagaaa agaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttctggt tcagttttcatttgtgacttcagtgctttagtgttagttcattttctgtgaatcagtttccttat atgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtgaacac attttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggtagcgt ctgaagaggtgcctggactaagatggtcccagagccacaaggttttgccaaacatgacgctttg tgaattcataacaagggctccaagtcaccagatcttagagctgacccagtgcactgtctgaaagg gggtaccagttctgaggcttcaagacatgtccccagcagatcttccccgtgccttcccagaggat tcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagag[g/a]tgtt aaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaa gcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaa atttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctg agtcagcccCGGGTTACGCCTGTTGTC	1002
NGFBu5	NGFB	T	C	V	A	cds	GE1185	CACATCCATAC TGCCTGAGT	AGGGGCCCAGG AGAGTG	CACATCCATACTGCCTGAGTcagccccgggttacgcctgttgtcccggtataaccattgctagca caccctttccctctcagaagtgccccggtttgaatgaaacctcttcgtgatccccttggaggtca actctgagggacccagaaactgccttttgactgcatttagtactccatgaagtcaccctcatttc tttttcattccaggtgcatagcgtaatgtccatgttgttctacactctgatcacagcttttctga tcggcatacaggcggaaccacactcagagagcaatgtccctgcaggacacaccatcccccaag[t /c]ccactggactaaacttcagcattcccttgacactgcccttcgcagagcccgcagcgccccgg cagcggcgatagctgcacgcgtggcggggcagacccgcaacattactgtggaccccaggctgttt aaaaagcggcgactccgttcaccccgtgtgctgtttagcacccagcctccccgtgaagctgcaga cactcaggatctggacttcgaggtcggtggtgctgccccccttcaacaggactcacaggagcaagc ggtcatcatcccatcccatcttccacaggggcgaattctcggtgtgtgacagtgtcagcgtgtgg gttggggataagaccaccgccacagacatcaagggcaaggaggtgatggtgttgggagaggtgaa cattaacaacagtgtattcaaacagtactttttgagaccaagtgccgggacccaaatcccgttg acagcgggtgccggggcattgactcaaagcactggaactcatattgtaccacgactcacaccttt gtcaaggcgctgaccatggatggcaagcaggctgcctggcggtttatccggatagatacggcctg tgtgtgtgtgctcagcaggaaggctgtgagaagagcctgacctgccgacacgctccctcccccctg ccccttctaCACTCTCCTGGGCCCCT	1001

FIG. 5CCCCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBu6	NGFB	T	C	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaattccacaattac[t/c]tgaccaagttgggggattattt gtggggtaactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatcta tagtcacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggaggga gaaaagaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttc tggttcagttttcatttgtgacttcagtgctttagtgttagttcatttctgtgaatcagtttcc ttatatgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtga acacattttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggta gcgtctgaagaggtgcctggactaagatggtcccagagccacaaggtttttgccaaacatgacgc tttgtgaattcataacaagggctccaagtcaccagatcttagagctgacccagtgcactgtctga aagggggtaccagttctgaggcttcaagacatgtccccagcagatcttccccgtgccttcccaga ggattcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagaggtgtt aaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaa gcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaa atttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctg agtcagcccCGGGTTACGCCTGTTGTC	1002
NGFBu7	NGFB	C	T	-	-	noncoding	GE1186	TTTACAGAGGA GCTGACGTTTG	GACAACAGGCG TAACCCG	TTTACAGAGGAGCTGACGTTTGctacacatctacaagtatgcataggagctccgcggaggccagt gagaggccctccaggagcagaactaattccacaattacttgaccaagttgggggattatttgtgg ggtaactgcagtgcagtatggagtcctcttggggacagttagagccataccatttgatctatagt cacataagaacaaacaataaaaagaaaagacatgcttaagagtgaaagagaaagggagggagaaa agaaggaagggtggatggaaggacactagcttagtaaggggtcaactttggattctatttctggt tcagttttcatttgtgacttcagtgctttagtgttagttcatttctgtgaatcagtttccttat atgtgaaataaatatgataaatcctaattgaactcacagactcatgagaagatagaagtgaacac attttaaaaacatcacacaaagaggaactattatgtggtccacatttatatatgtggggtagcgt ctgaagaggtgcctggactaagatggtcccagagccacaaggtttttgccaaacatgacgcttg tgaattcataacaagggctccaagtcaccagatcttagagctgacccagtgcactgtctgaaagg gggtaccagttctgaggcttcaagacatgtccccagcagatcttccc[c/t]gtgccttcccaga ggattcaaaactgttgagcaggacggcaccatcacatcaaggcacaagtgccagggagaggtgtt aaactctccccaccaacctccctggtacacacatggacacttaccacctccctcagccgccttaa gcttcagagaactcaaaggactctgtaagtgatgtctccaagctcatatcgaactactgggcaaa atttcaggggctctgtcacttcctggagaagctcggatggggtgaccacacatccatactgcctg agtcagcccCGGGTTACGCCTGTTGTC	1002

FIG. 5DDDDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NGFBu8	NGFB	G	C	-	-	noncoding	GE1185	CACATCCATAC TGCCTGAGT	AGGGGCCCAGG AGAGTG	CACATCCATACTGCCTGAGTcagccccgggttacgcctgttgtcccggtataaccattgctagca caccctttccctctcagaagtgcccc[g/c]gtttgaatgaaacctcttcgtgatccccttggag gtcaactctgagggacccagaaactgccttttgactgcatttagtactccatgaagtcaccctca tttctttttcattccaggtgcatagcgtaatgtccatgttgttctacactctgatcacagctttt ctgatcggcatacaggcggaaccacactcagagagcaatgtccctgcaggacacaccatcccccca agtccactggactaaacttcagcattcccttgacactgcccttcgcagagcccgcagcgccccgg cagcggcgatagctgcacgcgtggcggggcagacccgcaacattactgtggaccccaggctgttt aaaaagcggcgactccgttcaccccgtgtgctgtttagcacccagcctccccgtgaagctgcaga cactcaggatctggacttcgaggtcggtggtgctgccccccttcaacaggactcacaggagcaagc ggtcatcatcccatcccatcttccacaggggcgaattctcggtgtgtgacagtgtcagcgtgtgg gttggggataagaccaccgccacagacatcaagggcaaggaggtgatggtgttgggagaggtgaa cattaacaacagtgtattcaaacagtactttttgagaccaagtgccgggacccaaatcccgttg acagcgggtgccggggcattgactcaaagcactggaactcatattgtaccacgactcacaccttt gtcaaggcgctgaccatggatggcaagcaggctgcctggcggtttatccggatagatacggcctg tgtgtgtgtgctcagcaggaaggctgtgagaagagcctgacctgccgacacgctccctccccctg cccccttctaCACTCTCCTGGGCCCCT	1001
NT3u1	NT3	A	G	P	P	cds	GE1317	CCTTTTCAGAT CTTACAGGTGA	AAGCACACTGA TTTTATTGAGA A	CCTTTTCAGATCTTACAGGTGAacaaggtgatgtccatcttgttttatgtgatatttctcgctta tctccgtggcatccaaggtaacaacatggatcaaaggagtttgccagaagactcgctcaattccc tcattattaagctgatccaggcagatattttgaaaaacaagctctccaagcagatggtggacgtt aaggaaaattaccagagcaccctgcccaaagctgaggctccccgagagccggagcggggagggcc cgccaagtcagcattccagcc[a/g]gtgattgcaatggacaccgaactgctgcgacaacagaga cgctacaactcaccgcgggtcctgctgagcgacagcaccccccttggagcccccgcccttgtatct catggaggattacgtgggcagccccgtggtggcgaacagaacatcacggcggaaacggtacgcgg agcataagagtcaccgaggggagtactcggtatgtgacagtgagagtctgtgggtgaccgacaag tcatcggccatcgacattcggggacaccaggtcacggtgctgggggagatcaaaacgggcaactc tcccgtcaaacaatattttttatgaaacgcgatgtaaggaagccaggccggtcaaaaacggttgca ggggtattgatgataaacactggaactctcagtgcaaaacatcccaaacctacgtccgagcactg acttcagagaacaataaactcgtgggctggcggtggatacggatagacacgtcctgtgtgtgtgc cttgtcgagaaaaatcggaagaacatgaattggcatctctccccatatataaattattactttaa attatatgatatgcatgtagcatataaatgtttatattgttttttatatattataagttgaccttt atttattaaacttcagcaaccctacagtatataagcttttTTCTCAATAAAATCAGTGTGCTT	973
NT3u2	NT3	C	T	P	P	cds	GE1317	CCTTTTCAGAT CTTACAGGTGA	AAGCACACTGA TTTTATTGAGA A	CCTTTTCAGATCTTACAGGTGAacaaggtgatgtccatcttgttttatgtgatatttctcgctta tctccgtggcatccaaggtaacaacatggatcaaaggagtttgccagaagactcgctcaattccc tcattattaagctgatccaggcagatattttgaaaaacaagctctccaagcagatggtggacgtt aaggaaaattaccagagcaccctgcccaaagctgaggctccccgagagccggagcggggagggcc cgccaagtcagcattccagccagtgattgcaatggacaccgaactgctgcgacaacagagacgct acaactcaccgcgggtcctgctgagcgacagcaccccccttggagcccccgcccttgtatctcatg gaggattacgtgggcagccccgtggtggcgaacagaacatcacggcggaaacggtacgcggagca taagagtcaccgaggggagtactcggtatgtgacagtgagagtctgtgggtgaccgacaagtcat cggccatcgacattcggggacaccaggtcacggtgctgggggagatcaaaacgggcaactctcc[c/t]gtcaaacaatattttttatgaaacgcgatgtaaggaagccaggccggtcaaaaacggttgca ggggtattgatgataaacactggaactctcagtgcaaaacatcccaaacctacgtccgagcactg acttcagagaacaataaactcgtgggctggcggtggatacggatagacacgtcctgtgtgtgtgc cttgtcgagaaaaatcggaagaacatgaattggcatctctccccatatataaattattactttaa attatatgatatgcatgtagcatataaatgtttatattgttttttatatattataagttgaccttt atttattaaacttcagcaaccctacagtatataagcttttTTCTCAATAAAATCAGTGTGCTT	973

FIG. 5EEEEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NTRK1d 10	NTRK1	C	T	-	-	noncoding	GE1290	GCTGCCCTGGGTGAACA	GGGATGTCTATAGGGAAGGGA	GCTGCCCTGGGTGAACAgcagtgaggct[c/t]ggcccccaactcagtcctgtccctgccgcttccatccaggcactgaaggaggcgtccgagagtgctcggcaggacttccaacgtgaggctgagctgctcaccatgctgcagcaccagcacatcgtgcgcttcttcggcgtctgcaccgagggccgcccccctgctcatggtcttcgagtatatgcggcacggggacctcaaccgcttcctccggtaccagcacctggcctcagcgctggccccggcccctggctctgggccccgtctTCCCTTCCCTATAGACATCCC	320
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NTRK1u 1	NTRK1	A	G	Q	Q	cds	GE1290	GCTGCCCTGGGTGAACA	GGGATGTCTATAGGGAAGGGA	GCTGCCCTGGGTGAACAgcagtgaggctcggcccccaactcagtcctgtccctgccgcttccatccaggcactgaaggaggcgtccgagagtgctcggcaggacttcca[a/g]cgtgaggctgagctgctcaccatgctgcagcaccagcacatcgtgcgcttcttcggcgtctgcaccgagggccgcccccctgctcatggtcttcgagtatatgcggcacggggacctcaaccgcttcctccggtaccagcacctggcctcagcgctggccccggcccctggctctgggccccgtctTCCCTTCCCTATAGACATCCC	320
NTRK1u 2	NTRK1	C	T	F	F	cds	GE1290	GCTGCCCTGGGTGAACA	GGGATGTCTATAGGGAAGGGA	GCTGCCCTGGGTGAACAgcagtgaggctcggcccccaactcagtcctgtccctgccgcttccatccaggcactgaaggaggcgtccgagagtgctcggcaggacttccaacgtgaggctgagctgctcaccatgctgcagcaccagcacatcgtgcgcttctt[c/t]ggcgtctgcaccgagggccgcccccctgctcatggtcttcgagtatatgcggcacggggacctcaaccgcttcctccggtaccagcacctggcctcagcgctggccccggcccctggctctgggccccgtctTCCCTTCCCTATAGACATCCC	320
NTRK1u 3	NTRK1	C	T	H	Y	cds	GE1129	CAGGCTCCTGGGAGTTCTATC	CCAGGGTGTCTACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctcctttttcttgttcacagatcc[c/t]atggacccgatgccaagctgctggctggtggggaggatgtggctccaggcccccctgggtctggggcagctgctggccgtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcatttttgtgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgattttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacgccttcccctgcATCCAAACTGTAGACACCCTGG	358
NTRK1u 4	NTRK1	C	T	A	A	cds	GE1129	CAGGCTCCTGGGAGTTCTATC	CCAGGGTGTCTACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctcctttttcttgttcacagatcccatggacccgatgccaagctgctggctggtggggaggatgtggctccaggcccccctgggtctggggcagctgctggc[c/t]gtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcatttttgtgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgattttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacgccttcccctgcATCCAAACTGTAGACACCCTGG	358
NTRK1u 5	NTRK1	T	G	-	-	noncoding	GE1067	GGAGGCTCTGAGAGTACAGGAG	AGTAGGAAACAAAGCCAGGAG	GGAGGCTCTGAGAGTACAGGAGgagcccctggatctaactacccctgtcccccaccaggtctcggtggctgtgggcctggccgtctttgcctgcctcttcctttctacgctgctccttgtgctcaacaaatgtggacggagaaacaagtttgggatcaaccg[t/g]agtcggggctgcagagggctgtctgtctgtctgttCTCCTGGCTTTGTTTCCTACT	223
NTRK1u 6	NTRK1	C	T	G	G	cds	GE1129	CAGGCTCCTGGGAGTTCTATC	CCAGGGTGTCTACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctcctttttcttgttcacagatcccatggacccgatgccaagctgctggctggtggggaggatgtggctccagg[c/t]cccctgggtctggggcagctgctggccgtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcatttttgtgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgattttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacgccttcccctgcATCCAAACTGTAGACACCCTGG	358

FIG. 5FFFFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
NTRK1u7	NTRK1	G	T	G	V	cds	GE1129	CAGGCTCCTGGGAGTTCTATC	CCAGGGTGTCTACAGTTTGGAT	CAGGCTCCTGGGAGTTCTATCctcccagcctatcccctctcctttcttgttcacagatcccatggacccgatgccaagctgctggctg[g/t]tggggaggatgtggctccaggcccccctgggtctggggcagctgctggccgtggctagccaggtcgctgcggggatggtgtacctggcgggtctgcatttgtgcaccgggacctggccacacgcaactgtctagtgggccagggactggtggtcaagattggtgattttggcatgagcagggatatctacagcaccgactattaccgtgtaagggtcctttgtccccaacgccttcccctgcATCCAAACTGTAGACACCCTGG	358
NTRK1u8	NTRK1	C	T	F	F	cds	GE1042	CCAGGGGCCCGAGTAGC	AGCCCAAGTCTGGGTGTCCT	CCAGGGGCCCGAGTAGCtgagacctggggactgatcctcctgcacccctccccagcaccatcgtgaagagtggtctccgttt[c/t]gtggcgccagatgccttccatttcactcctcggctcagtcgcctgtgagtgtggccagtgctgggcagtgggagttggggAGGACACCCAGACTTGGGCT	187
PACEd12	PACE	g	T	-	-	noncoding	GE1219	GAGTCGCAGGGGGTGCC	AGCAAAGGCAAGCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcacagagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcctgggcgagcccaaccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctctgtccctgcccgccctgcccagcgccgcc[g/t]cctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEd13	PACE	G	T	R	R	cds	GE1219	GAGTCGCAGGGGGTGCC	AGCAAAGGCAAGCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcacagagacatcgggaaacg[g/t]ctcgaggtgcggaagaccgtgaccgcgtgcctgggcgagcccaaccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctctgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEu1	PACE	C	G	G	G	cds	GE687	GTCTGTTTAGCTGACACACACTT	CAGCTGGGGTCCAAACC	GTCTGTTTAGCTGACACACACTTgccctctctcccacgccggcagtgtgcgaggaaggcttctccctgcaccagaagagctgtgtccagcactgccctccagg[c/g]ttcgccccccaagtcctcgatacgcactatagcaccgagaatgacgtggagaccatccgggccagcgtctgcgcccctgccacgcctcatgtgccacatgccaggggccggccctgacagactgcctcagctgccccagccacgcctccttggaccctgtggagcagacttgctcccggcaaagccagagcagccgagagtccccgccacagcagcagccacctcggctgcccccggaggtggaggcggggcaacggctgcgggcagggctgctgccctcacacctgcctgaggtggtggccggcctcagctgcgccttcatcgtgctggtcttcgtcactgtcttcctggtcctgcagctgcgctctggctttagttttcgggggtgaaggtgtacaccatggaccgtggcctcatctcctacaaggggctgccccctgaagcctggcaggaggagtgcccgtctgactcagaagaggacgagggccggggcgagaggaccgcctttatcaaagaccagagcgccctctgatgagcccactgcccacccccctcaagccaatcccctccttgggcactttttaattcaccaaagtatttttttatcttgggactgGGTTTGGACCCCAGCTG	742
PACEu10	PACE	G	A	G	S	cds	GE548	GAGAGCTGCTCCCAAAAA	ACCTAACTCCACATCCAGCC	GAGAGCTGCTCCCAAAAAagactgatccccagcctctcccttccttctttgcagtaagaacctcacatggcgggacatgcaacacctggtggtacagacctcgaagccagcccacctcaatgccaacgactgggccaccaat[g/a]gtgtgggccggaaaggtgagggcaggctggcccggcaGGCTGGATGTGGAGTTAGGT	204
PACEu11	PACE	T	A	L	Q	cds	GE1219	GAGTCGCAGGGGGTGCC	AGCAAAGGCAAGCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcacagagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcctgggcgagcccaaccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggccatccacc[t/a]ggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctctgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320

FIG. 5GGGGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PACEu2	PACE	G	C	S	T	cds	GE687	GTCTGTTTAGCTGACACACACTT	CAGCTGGGGTCCAAACC	GTCTGTTTAGCTGACACACACTTgccctctctcccacgccggcagtgtgcgaggaaggcttctccctgcaccagaagagctgtgtccagcactgccctccaggcttcgcccccaagtcctcgatacgcactatagcaccgagaatgacgtggagaccatccgggccagcgtctgcgcccctgccacgcctcatgtgccacatgccaggggccggccctgacagactgcctcagctgccccagccacgcctccttggaccctgtggagcagacttgctcccggcaaagccagagcagccgagagtccccgccacagcagcagccacctcggctgcccccggaggtggaggcggggcaacggctgcgggcagggctgctgccctcacacctgcctgaggtggtggccggcctcagctgcgccttcatcgtgctggtcttcgtcactgtcttcctggtcctgcagctgcgctctggctttagttttcgggggtgaaggtgtacaccatggaccgtggcctcatctcctacaaggggctgcccctgaagcctggcaggaggagtgcccgtctgactcagaagaggacgagggccggggcgagaggaccgcctttatcaaagaccaga[g/c]cgccctctgatgagcccactgcccacccctcaagccaatcccctccttgggcactttttaattcaccaaagtatttttttatcttgggactgGGTTTGGACCCCAGCTG	742
PACEu3	PACE	C	T	-	-	noncoding	GE590	GTCCACAGGGCCGAGGG	AGCCCCATCTCCCCAGC	GTCCACAGGGCCGAGGGggctgggctccatctttgtctgggc[c/t]tcggggaacgggggccgggaacatgacagctgcaactgcgacggctacaccaacagtatctacacgctgtccatcagcagcgccacgcagtttggcaacgtgccgtggtacagcgaggcctgctcgtccacactggccacgacctacagcagtggcaaccagaatgagaagcagatcgtgagtcttacctgggggtggggGCTGGGGAGATGGGGCT	265
PACEu4	PACE	G	C	L	L	cds	GE1219	GAGTCGCAGGGGGTGCC	AGCAAAGGCAAGCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcacagagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcct[g/c]ggcgagcccaaccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctctgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEu5	PACE	C	T	G	G	cds	GE1219	GAGTCGCAGGGGGTGCC	AGCAAAGGCAAGCACGC	GAGTCGCAGGGGGTGCCcgctggtccctctgggccaggctgaccatcatggtgctctcctgcacagagacatcgggaaacggctcgaggtgcggaagaccgtgaccgcgtgcctggg[c/t]gagcccaaccacatcactcggctggagcacgctcaggcgcggctcaccctgtcctataatcgccgtggcgacctggccatccacctggtcagccccatgggcacccgctccaccctgctggcagccaggtgcttgctctgtccctgcccgccctgcccagcgccgcctcctctcacagcccGCGTGCTTGCCTTTGCT	320
PACEu6	PACE	T	C	-	-	noncoding	GE1195	AGCCAATCCCCTCCTTGG	CAGCATCGGGTGGGAGG	AGCCAATCCCCTCCTTGGcactttttaattcaccaaagtatttttttatcttgggactgggtttggaccccagctgggaggcaagaggggtggagactg[t/c]ttcccatcctaccctcgggcccacctggccacctgaggtgggcccaggaccagctggggcgtggggagggccgtaccccaccctcagcacccctccatgtggagaaaggagtgaaacctttagggcagcttgccccggccccggccccagccagagttcctgcggagtgaagaggggcagcccttgcttgttgggattcctgacccaggccgcagctcttgcccttccctgtccctctaaagcaataatggtcccatccaggcagtcgggggctggcctaggagatatctgagggaggaggccacctctccaagggcttctgcaccctccaccctgtcccccagctctggtgagtcttggcggcagcagccatcataggaagggaccaaggcaaggcaggtgcctccaggtgtgcacgtggcatgtggcctgtggcctgtgtcccatgacccacccctgtgctccgtgcctccaccaccactggccaccaggctggcgcagccaaggccgaagctctggctgaaccctgtgctggtgtcctgaccaccctcccctctcttgcacccgcctctcccgtcagggcccaagtccctgttttctgagcccgggctgcctgggctgttggcactcacagacctggagcccctgggtgggtggtggggaggggcgctggcccagccggcctctctggCCTCCCACCCGATGCTG	814

FIG. 5HHHHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PACEu7	PACE	G	A	-	-	noncoding	GE1195	AGCCAATCCCC TCCTTGG	CAGCATCGGGT GGGAGG	AGCCAATCCCCTCCTTGGcactttttaattcaccaaagtatttttttatcttgggactgggttt ggaccccagctgggaggcaagaggggtggagactgtttcccatcctaccctcgggcccacctggc cacctgaggtgggcccaggaccagctggggcgtggggagggccgtaccccaccctcagcacccct tccatgtggagaaaggagtgaaacctttagggcagcttgccccggccccggccccagccagagtt cctgcggagtgaagaggggcagcccttgcttgttgggattcctgacccaggccgcagctcttgcc cttccctgtccctctaaagcaataatggtcccatccag[g/a]cagtcgggggctggcctaggag atatctgagggaggaggccacctctccaagggcttctgcaccctccaccctgtcccccagctctg gtgagtcttggcggcagcagccatcataggaagggaccaaggcaaggcaggtgcctccaggtgtg cacgtggcatgtggcctgtggcctgtgtcccatgacccacccctgtgctccgtgcctccaccacc actggccaccaggctggcgcagccaaggccgaagctctggctgaaccctgtgctggtgtcctgac caccctcccctctcttgcacccgcctctcccgtcagggcccaagtccctgttttctgagcccggg ctgcctgggctgttggcactcacagacctggagcccctgggtgggtggtggggaggggcgctggc ccagccggcctctctggCCTCCCACCCGATGCTG	814
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PACEu9	PACE	G	C	L	L	cds	GE590	GTCCACAGGGC CGAGGG	AGCCCCATCTC CCCAGC	GTCCACAGGGCCGAGGGggctgggctccatctttgtctgggcctcggggaacgggggccgggaa catgacagctgcaactgcgacggctacaccaacagtatctacacgct[g/c]tccatcagcagcg ccacgcagtttggcaacgtgccgtggtacagcgaggcctgctcgtccacactggccacgacctac agcagtggcaaccagaatgagaagcagatcgtgagtcttacctgygggtggggGCTGGGGAGATG GGGCT	265
PAI1d10	PAI1	C	T	-	-	noncoding	GE285	GGGAGACCCTG TCTCTAAGAA	GTCTGCATCTG TCGGGACTA	GGGAGACCCTGTCTCTAAGAAaaacggcgggggtgggggtggtgccagtgccagcatccctctgt tctaagacattgtcccttctcttgcagctgtcatagtctcagcccgcatggcccccgaggagatc atcatggacagacccttcctctttgtggtccggcacaaccccacaggtgagcctggaacccatca [c/t]gttccacatcctcccacccattctttctctcaggaacTAGTCCCGACAGATGCAGAC	257
PAI1d11	PAI1	G	A	-	-	noncoding	GE384	AGAAGAGCAGG GCCCACAG	CCAGCCTTTCC TTGGCTTC	AGAAGAGCAGGGCCCACAGctggccagctcccctcccctccc[g/a]cctgtcttccagaacgat tccttcaccagccctctttccattgctctaggatgcagatgtctccagccctcacctgcctagtc ctgggcctggcccttgtctttggtgaagggtctgctgtgcaccatcccccatcctacgtggccca cctggcctcagacttcggggtgagggtgtttcagcaggtggcgcaggcctccaaggaccgcaacg tggttttctcaccctatggggtggcctcggtgttggccatgctccagctgacaacaggaggagaa acccagcagcagattcaagcagctatgggattcaagattgatggtgagccacgggacaccagggg aggtgggtggcatgcagaacagacctaccaGAAGCCAAGGAAAGGCTGG	439

FIG. 5IIIIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI1u1	PAI1	T	G	S	A	cds	GE268	GCCCCTAAGAGGAAAAAGGAA	GGGTCTGGGGACCAGTTATC	GCCCCTAAGAGGAAAAAGGAAcctctccttgagagcggcagcgatctaatcctgtatccacatctgtttgcagaccaagagcctctccacgtcgcgcaggcgctgcagaaagtgaagatcgaggtgaacgagagtggcacggtggcctcctca[t/g]ccacaggtgagtctggctcaggtgaggctccacgggtgtcgcctccatcgcccttcagGATAACTGGTCCCCAGACCC	236
PAI1u2	PAI1	G	A	V	I	cds	GE384	AGAAGAGCAGGGCCCACAG	CCAGCCTTTCCTTGGCTTC	AGAAGAGCAGGGCCCACAGctggccagctcccctcccctcccgcctgtcttccagaacgattccttcaccagccctctttccattgctctaggatgcagatgtctccagccctcacctgcctagtcctgggcctggcccctt[g/a]tctttggtgaagggtctgctgtgcaccatcccccatcctacgtggcccacctggcctcagacttcggggtgagggtgtttcagcaggtggcgcaggcctccaaggaccgcaacgtggtttctcaccctatggggtggcctcggtgttggccatgctccagctgacaacaggaggagaaacccagcagcagattcaagcagctatgggattcaagattgatggtgagccacgggacaccaggggaggtgggtggcatgcagaacagacctaccaGAAGCCAAGGAAAGGCTGG	439
PAI1u3	PAI1	G	A	A	A	cds	GE379	GGTAGCCCCCATCCATCAG	CAACTGGGATATGTGGATTTATTT	GGTAGCCCCCATCCATCAGagtggagccccttgtgggggaagtgggctcggctgggaaccctcaattcagcataagcctcacatgtcctctcctctctgtcccggtgcagacaagggcatggcccccgccctccggcatctgtacaaggagctcatggggccatggaacaaggatgagatcagcaccacagacgc[g/a]atcttcgtccagcgggatctgaagctggtccagggcttcatgccccacttcttcaggctgttccggagcacggtcaagcaagtggacttttcagaggtggagagagccagattcatcatcaatgactgggtgaagacacacacaaaaggtgagcaggcagggaaaggaaacccatttcctgggcctcaagagaaagggaatttggAAATAAATCCACATATCCCAGTTG	429
PAI1u4	PAI1	G	A	A	T	cds	GE384	AGAAGAGCAGGGCCCACAG	CCAGCCTTTCCTTGGCTTC	AGAAGAGCAGGGCCCACAGctggccagctcccctcccctcccgcctgtcttccagaacgattccttcaccagccctctttccattgctctaggatgcagatgtctccagccctcacctgcctagtcctgggcctg[g/a]cccttgtctttggtgaagggtctgctgtgcaccatcccccatcctacgtggcccacctggcctcagacttcggggtgagggtgtttcagcaggtggcgcaggcctccaaggaccgcaacgtggtttctcaccctatggggtggcctcggtgttggccatgctccagctgacaacaggaggagaaacccagcagcagattcaagcagctatgggattcaagattgatggtgagccacgggacaccaggggaggtgggtggcatgcagaacagacctaccaGAAGCCAAGGAAAGGCTGG	439
PAI1u5	PAI1	A	G	D	G	cds	GE379	GGTAGCCCCCATCCATCAG	CAACTGGGATATGTGGATTTATTT	GGTAGCCCCCATCCATCAGagtggagccccttgtgggggaagtgggctcggctgggaaccctcaattcagcataagcctcacatgtcctctcctctctgtcccggtgcagacaagggcatggcccccgccctccggcatctgtacaaggagctcatggggccatggaacaagg[a/g]tgagatcagcaccacagacgcgatcttcgtccagcgggatctgaagctggtccagggcttcatgccccacttcttcaggctgttccggagcacggtcaagcaagtggacttttcagaggtggagagagccagattcatcatcaatgactgggtgaagacacacacaaaaggtgagcaggcagggaaaggaaacccatttcctgggcctcaagagaaagggaatttggAAATAAATCCACATATCCCAGTTG	429
PAI1u6	PAI1	G	C	G	R	cds	GE363	AACTAGGTGAAAACCCAGTGCT	GTCCTGCAAGCGTCACAGAT	AACTAGGTGAAAACCCAGTGCTgggttgccatcagcaagagctggagccatttccaacgaaccatcttgtcgtcttcacagctgagttcaccacgcccgatggccattactacgacatcctggaactgccctaccac[g/c]gggacaccctcagcatgttcattgctgccccttatgaaaaagaggtgcctctctctgccctcaccaacattctgagtgcccagctcatcagccactggaaaggcaacatgaccaggctgccccgcctcctggttctgcccaagtaagccaccccgctatctccccgacctaccaacccctctctcctggctccctaaagtcaccgcccccaggttgaatttcccagATCTGTGACGCTTGCAGGAC	388

FIG. 5JJJJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI1u7	PAI1	A	T	I	F	cds	GE379	GGTAGCCCCCATCCATCAG	CAACTGGGATATGTGGATTTATTT	GGTAGCCCCCATCCATCAGagtggagccccttgtgggggaagtgggctcggctgggaaccctcaattcagcataagcctcacatgtcctctcctctctgtcccggtgcagacaagggcatggcccccgccctccggcatctgtacaaggagctcatggggccatggaacaaggatgagatcagcaccacagacgcg[a/t]tcttcgtccagcgggatctgaagctggtccagggcttcatgccccacttcttcaggctgttccggagcacggtcaagcaagtggacttttcagaggtggagagagccagattcatcatcaatgactgggtgaagacacacacaaaaggtgagcaggcagggaaaggaaacccatttcctgggcctcaagagaaagggaatttggAAATAAATCCACATATCCCAGTTG	429
PAI1u8	PAI1	A	T	L	L	cds	GE298	GTAGGGGATGGGGAAAGGT	TCTCAAGGAGAGGTTCCTTTTT	GTAGGGGATGGGGAAAGGTgggagctgccagccagagggggaccccggcttgagcagcctcttgctgctatctgcaggttctccctggagactgaagtcgacctcaggaagcccct[a/t]gagaacctgggaatgaccgacatgttcagacagtttcaggctgacttcacgagtctttcaggtaagaagactttcctttgcatttctcaccccagtggactgcgggggcccctaagaggAAAAAGGAACCTCTCCTTGAGA	263
PAI1u9	PAI1	A	T	-	-	noncoding	GE285	GGGAGACCCTGTCTCTAAGAA	GTCTGCATCTGTCGGGACTA	GGGAGACCCTGTCTCTAAGAAaaacggcgggggtgggggtggtgccagtgccagcatccctctgttctaagacattgtcccttctcttgc[a/t]gctgtcatagtctcagcccgcatggcccccgaggagatcatcatggacagacccttcctctttgtggtccggcacaaccccacaggtgagcctggaacccatcacgttccacatcctcccacccattctttctctcaggaacTAGTCCCGACAGATGCAGAC	257
PAI2d15	PAI2	C	T	-	-	noncoding	GE341	TCCTACTGTTGCTGACCTCAC	GCATAAACAAGAGCAGTTCTCCA	TCCTACTGTTGCTGACCTCACccaaaatgttaccttatgtttcagagctgtttttttcttcctctctttgcttctagattgaaacaatggaggatctttgtgtggcaaacacactctttgccctcaatttattcaagcatctggcaaaagcaagccccacccagaacctcttcctctccccatggagcatctcgtccaccatggccatggtctacatgggctccaggggcagcaccgaagaccagatggccaaggtgagtttgagctgaagctccacatttgggc[c/t]gagtagttcctgaatggaatTGGAGAACTGCTCTTGTTTATGC	333
PAI2d16	PAI2	T	G	-	-	noncoding	GE341	TCCTACTGTTGCTGACCTCAC	GCATAAACAAGAGCAGTTCTCCA	TCCTACTGTTGCTGACCTCACccaaaatgttaccttatgtttcagagctgtttttttcttcctctctttgcttctagattgaaacaatggaggatctttgtgtggcaaacacactctttgccctcaatttattcaagcatctggcaaaagcaagccccacccagaacctcttcctctccccatggagcatctcgtccaccatggccatggtctacatgggctccaggggcagcaccgaagaccagatggccaaggtgagtttgagctgaagctccacatttgggccgag[t/g]agttcctgaatggaatTGGAGAACTGCTCTTGTTTATGC	333
PAI2d17	PAI2	C	G	-	-	noncoding	GE341	TCCTACTGTTGCTGACCTCAC	GCATAAACAAGAGCAGTTCTCCA	TCCTACTGTTGCTGACCTCACccaaaatgttaccttatgtttcagagctgtttttttcttcct[c/g]tctttgcttctagattgaaacaatggaggatctttgtgtggcaaacacactctttgccctcaatttattcaagcatctggcaaaagcaagccccacccagaacctcttcctctccccatggagcatctcgtccaccatggccatggtctacatgggctccaggggcagcaccgaagaccagatggccaaggtgagtttgagctgaagctccacatttgggccgagtagttcctgaatggaatTGGAGAACTGCTCTTGTTTATGC	333
PAI2d18	PAI2	G	A	-	-	noncoding	GE318	CCACCTGATAGCCATCTGTTTT	CCAGTCTGACACTGTGGCTTTA	CCACCTGATAGCCATCTGTTTTaaaagttcagtaaatccgtgggcaagtgtaacc[g/a]ttttctctaattctgattgcaggtgcttcagtttaatgaagtgggagccaatgcagttacccccatgactccagagaactttaccagctgtgggttcatgcagcagatccagaagggtagttatcctgatgcgatttgcaggtatctgacttactggtccaaatttcttttgtggtttatttttgcaatcttcctgtctTAAAGCCACAGTGTCAGACTGG	282
PAI2d19	PAI2	C	A	N	K	cds	GE318	CCACCTGATAGCCATCTGTTTT	CCAGTCTGACACTGTGGCTTTA	CCACCTGATAGCCATCTGTTTTaaaagttcagtaaatccgtgggcaagtgtaaccgttttctctaattctgattgcaggtgcttcagtttaatgaagtgggagccaatgcagttacccccatgactccagagaa[c/a]tttaccagctgtgggttcatgcagcagatccagaagggtagttatcctgatgcgatttgcaggtatctgacttactggtccaaatttcttttgtggtttatttttgcaatcttcctgtctTAAAGCCACAGTGTCAGACTGG	282

FIG. 5KKKKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2d2 0	PAI2	G	C	A	A	cds	GE318	CCACCTGATAG CCATCTGTTTT	CCAGTCTGACA CTGTGGCTTTA	CCACCTGATAGCCATCTGTTTTaaaagttcagtaaatccgtgggcaagtgtaaccgtttctcta attctgattgcaggtgcttcagtttaatgaagtgggagccaatgcagttacccccatgactccag agaactttaccagctgtgggttcatgcagcagatccagaagggtagttatcctgatgc[g/c]at tttgcaggtatctgacttactggtccaaatttcttttgtggtttattttgcaatcttcctgtct TAAAGCCACAGTGTCAGACTGG	282
PAI2d2 1	PAI2	T	C	-	-	noncoding	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgattttaatattagacttaaag ttgtttccttctttctaatacttgctgtaatttcttttgtttgttttgttttg[t/c]tttgc tttgcagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatgg ctgaagatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatcc attctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtc ggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagg gcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacag tttgtggcagatcatcctttttctttttcttattatgcataagataaccaactgcatttttatttt cggcagatttcctcaccctaaaactaagcgtgctgcttctgcaaaagattttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgtttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2d2 2	PAI2	C	T	-	-	noncoding	GE397	TCTGTTAAGTT CTATATCACCC ACA	GAAGTTGTTCA GAAGAGCAGAA AT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgattttaatattagacttaaag ttgtttccttctttctaatacttgctgtaatttcttttgtttgttttgttttgttttgctttg cagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctga agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattc tgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggag aggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcac tgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttg tggcagatcatcctttttctttttcttattatgcataagataaccaactgcatttttattttcggc agatttcctcaccctaaaactaagcgtg[c/t]tgcttctgcaaaagattttgtagatgagct gtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgtttctacatATTTCTGCT CTTCTGAACAACTTC	665
PAI2d2 3	PAI2	T	A	-	-	noncoding	GE367	CAGAGTACCCA CTGTAAAGCAT GT	TTACCACACCA TTTGTAAGGAG TAT	CAGAGTACCCACTGTAAAGCATGTacaaataatttattttgttgatttaaaaaatcacattnnn nnnnnnnnnnnnnnnnnnnnnnnnnnatcttataatcgacttccatatttacctttaataat attaggctcagcgcacacctgtacagatgatgtacttgcgtgaaaagctaaacattggatacata gaagacctaaaggctcagattctagaactcccatatgctggagatgttagcatgttcttgttgct tccagatgaaattgccgatgtgtccactggcttggagctggtaagacattcagatatt[t/a]aa gtttctggggctatacctacctttcgtgagatgagatgaatatATACTCCTTACAAATGGTGTGG TAA	393
PAI2d2 4	PAI2	A	T	-	-	noncoding	GE367	CAGAGTACCCA CTGTAAAGCAT GT	TTACCACACCA TTTGTAAGGAG TAT	CAGAGTACCCACTGTAAAGCATGTacaaataatttattttgttgatttaaaaaatcacattnnn nnnnnnnnnnnnnnnnnnnnnnnnnnatcttataatcgacttccatatttacctttaataat attaggctcagcgcacacctgtacagatgatgtacttgcgtgaaaagctaaacattggatacata gaagacctaaaggctcagattctagaactcccatatgctggagatgttagcatgttcttgttgct tccagatgaaattgccgatgtgtccactggcttggagctggtaagacattcagatattt[a/t]a gtttctggggctatacctacctttcgtgagatgagatgaatatATACTCCTTACAAATGGTGTGG TAA	393

FIG. 5LLLLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2u1	PAI2	A	G	N	D	cds	GE315	AAAACTATTACCATGGCTTAAGAACTA	TTGAATTGTAGAGAACTGCTTTGAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattccttctttcttttcaaggcacaagctgcagataaaatccattcatccttccgctctctcagctctgcaatcaatgcatccacaggg[a/g]attatttactggaaagtgtcaataagctgtttggtgagaagtctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatgaagtcactTTCAAAGCAGTTCTCTACAATTCAA	293
PAI2u10	PAI2	C	G	V	V	cds	GE333	TGGCTACTCAGAACATTCAGTAAGT	GAGCGGTCTCTAATTTTCTGTCTAT	TGGCTACTCAGAACATTCAGTAAGTaatttcacagttcttgattatgaaacctaaatatatgttatgttttctgtaggcaaaatcccaaacttgttacctgaaggttctgtagatggggataccaggatggt[c/g]ctggtgaatgctgtctacttcaaaggaaagtggaaaactccatttgagaagaaactaaatgggctttatcctttccgtgtaaactcggtatgagacaacaaaatacatcttcctagcatatattttagggcttttgacaagatATAGACAGAAAATTAGAGACCGCTC	305
PAI2u11	PAI2	G	A	-	-	noncoding	GE333	TGGCTACTCAGAACATTCAGTAAGT	GAGCGGTCTCTAATTTTCTGTCTAT	TGGCTACTCAGAACATTCAGTAAGTaatttcacagttcttgattatgaaacctaaatatatgttatgttttct[g/a]taggcaaaatcccaaacttgttacctgaaggttctgtagatggggataccaggatggtcctggtgaatgctgtctacttcaaaggaaagtggaaaactccatttgagaagaaactaaatgggctttatcctttccgtgtaaactcggtatgagacaacaaaatacatcttcctagcatatattttagggcttttgacaagatATAGACAGAAAATTAGAGACCGCTC	305
PAI2u12	PAI2	G	A	R	H	cds	GE367	CAGAGTACCCACTGTAAAGCATGT	TTACCACACCATTTGTAAGGAGTAT	CAGAGTACCCACTGTAAAGCATGTacaaataatttatttgttgatttaaaaaatcacattnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnatcttataatcgacttccatatttacctttaataatattaggctcagc[g/a]cacacctgtacagatgatgtacttgcgtgaaaagctaaacattggatacatagaagacctaaaggctcagattctagaactcccatatgctggagatgttagcatgttcttgttgcttccagatgaaattgccgatgtgtccactggcttggagctggtaagacattcagatatttaagtttctggggctatacctacctttcgtgagatgagatgaatatATACTCCTTACAAATGGTGTGGTAA	393
PAI2u13	PAI2	T	A	D	E	cds	GE315	AAAACTATTACCATGGCTTAAGAACTA	TTGAATTGTAGAGAACTGCTTTGAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattccttctttcttttcaaggcacaagctgcaga[t/a]aaaatccattcatccttccgctctctcagctctgcaatcaatgcatccacagggaattatttactggaaagtgtcaataagctgtttggtgagaagtctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatgaagtcactTTCAAAGCAGTTCTCTACAATTCAA	293
PAI2u14	PAI2	G	A	K	K	cds	GE312	GGGAAGACCATAATTCACCATT	CTAAGTTCATGGATGGAAAAAGATA	GGGAAGACCATAATTCACCATTatgccatggcttgtttggtatgtattttatgtagcctttgtcattttcttgctttaaaggaatatattcgactctgtcagaaatattactcctcagaaccccaggcagtagacttcctagaatgtgcagaagaagctagaaaaaa[g/a]attaattcctgggtcaagactcaaaccaaaggtaaatccaagaaaatatttatttacttctttccagttagaaaactctgatcTATCTTTTTCCATCCATGAACTTAG	281
PAI2u2	PAI2	A	G	L	L	cds	GE315	AAAACTATTACCATGGCTTAAGAACTA	TTGAATTGTAGAGAACTGCTTTGAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattccttctttcttttcaaggcacaagctgcagataaaatccattcatccttccgctctctcagctctgcaatcaatgcatccacagggaattattt[a/g]ctggaaagtgtcaataagctgtttggtgagaagtctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatgaagtcactTTCAAAGCAGTTCTCTACAATTCAA	293

FIG. 5MMMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2u3	PAI2	T	G	P	P	cds	GE397	TCTGTTAAGTTCTATATCACCCACA	GAAGTTGTTCAGAAGAGCAGAAAT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgattttaatattagacttaaagttgttttccttctttctaatacttgctgtaatttcttttgtttgttttgttttgttttgctttgcagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctgaagatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttgtggcagatcatcc[t/g]tttctttttcttattatgcataagataaccaactgcattttattttt cggcagattttcctcaccctaaaactaagcgtgctgcttctgcaaaagattttgtagatgagctgtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCTCTTCTGAACAACTTC	665
PAI2u4	PAI2	C	G	N	K	cds	GE397	TCTGTTAAGTTCTATATCACCCACA	GAAGTTGTTCAGAAGAGCAGAAAT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgattttaatattagacttaaagttgttttccttctttctaatacttgctgtaatttcttttgtttgttttgttttgttttgctttgcagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctgaagatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttgtggcagatcatcctttctttttcttattatgcataagataaccaa[c/g]tgcattttatttttcggcagattttcctcaccctaaaactaagcgtgctgcttctgcaaaagattttgtagatgagctgtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCTCTTCTGAACAACTTC	665
PAI2u5	PAI2	C	G	S	C	cds	GE397	TCTGTTAAGTTCTATATCACCCACA	GAAGTTGTTCAGAAGAGCAGAAAT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgattttaatattagacttaaagttgttttccttctttctaatacttgctgtaatttcttttgtttgttttgttttgttttgctttgcagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctgaagatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcagggatgtcggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggagggcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttgtggcagatcatcctttctttttcttattatgcataagataaccaactgcattttatttttcggcagatttt[c/g]ctcaccctaaaactaagcgtgctgcttctgcaaaagattttgtagatgagctgtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCTCTTCTGAACAACTTC	665
PAI2u6	PAI2	C	G	V	V	cds	GE312	GGGAAGACCATAATTCACCATT	CTAAGTTCATGGATGGAAAAAGATA	GGGAAGACCATAATTCACCATTatgccatggcttgtttggtatgtattttatgtagcctttgtcattttcttgctttaaaggaatatattcgactctgtcagaaatattactcctcagaaccccaggcagtagacttcctagaatgtgcagaagaagctagaaaaagattaattcctgggt[c/g]aagactcaaaccaaaggtaaatccaagaaaatatttatttacttctttccagttagaaaactctgatcTATCTTTTTCCATCCATGAACTTAG	281

FIG. 5NNNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PAI2u7	PAI2	A	C	E	A	cds	GE397	TCTGTTAAGTTCTATATCACCCACA	GAAGTTGTTCAGAAGAGCAGAAAT	TCTGTTAAGTTCTATATCACCCACAatatagtaaagtgcactgattttaatattagacttaaagttgttttccttctttctaatacttgctgtaattttcttttgtttgttttgttttgttttgctttgcagctggaaagtgaaataacctatgacaaactcaacaagtggaccagcaaagacaaaatggctg[a/c]agatgaagttgaggtatacataccccagttcaaattagaagagcattatgaactcagatccattctgagaagcatgggcatggaggacgccttcaacaagggacgggccaatttctcaggatgtcggagaggaatgacctgtttctttctgaagtgttccaccaagccatggtggatgtgaatgaggaggcactgaagcagccgctggcacaggaggtgttatgacagggagaactggacatggaggcccacagtttgtggcagatcatcctttttctttttcttattatgcataagataaccaactgcatttatttttcggcagatttcctcaccctaaaactaagcgtgctgcttctgcaaaagattttgtagatgagctgtgtgcctcagaattgctatttcaaattgccaaaaatttagagatgttttctacatATTTCTGCTCTTCTGAACAACTTC	665
PAI2u8	PAI2	T	C	N	N	cds	GE315	AAAACTATTACCATGGCTTAAGAACTA	TTGAATTGTAGAGAACTGCTTTGAA	AAAACTATTACCATGGCTTAAGAACTAtcttgtttagtagttctgtgttatatataaagaattccttctttcttttcaaggcacaagctgcagataaaatccattcatccttccgctctctcagctctgcaatcaatgcatccacagggaa[t/c]tatttactggaaagtgtcaataagctgtttggtgagaagtctgcgagcttccgggaagtaagtgaaacctgtaattgaaatggctggatcccaaacaagtaatgaagtcactTTCAAAGCAGTTCTCTACAATTCAA	293
PAI2u9	PAI2	C	T	D	D	cds	GE312	GGGAAGACCATAATTCACCATT	CTAAGTTCATGGATGGAAAAAGATA	GGGAAGACCATAATTCACCATTatgccatggcttgtttggtatgtattttatgtagcctttgtcattttcttgctttaaaggaatatattcgactctgtcagaaatattactcctcagaaccccaggcagtaga[c/t]ttcctagaatgtgcagaagaagctagaaaaaagattaattcctgggtcaagactcaaaccaaaggtaaatccaagaaaatatttatttacttctttccagttagaaaactctgatcTATCTTTTTCCATCCATGAACTTAG	281
PC1d11	PC1	C	T	S	S	cds	GE1203	CCCTCCAGCCCAAATCT	GGAGATACTTACCTGGGCT	CCCTCCAGCCCAAATCTcacctggcgagatatgcagcacctggttgtctggacctctgagtatgacccgctggccaataaccctggatggaaaaagaatggagcaggcttgatggtgaatagtcgatttggatttggcttgctaaatgccaaagctctggtggatttagctgaccccaggacctggaggag[c/t]gtgcctgagaagaaagagtgtgttgtaaaggacaatgactttgAGCCCAGGTAAGTATCTCC	258
PC1u1	PC1	T	C	-	-	noncoding	GE1212	CTTCACTGAGCGCTCGCC	ACCTGACCCAAAAGGTCAT	CTTCACTGAGCGCTCGCCgccgcccagcctctcctctcgcgcctcctagctcttcgcagagcaaccaggagccaggagtggtc[t/c]agagcccgagggtgggaagggggagtctgtctggctttctcctatcttgcttctttttcctcttcccttcccactcttgttcaagcgagtgtgtgagctatggagcgaagagcctggagtctgcagtgcactgctttcgtcctcttttgcgcttggtgtgcactgaacagtgcaaaagcgaaaaggcaatttgtcaatgaatgggcagcggagatccccgggggcccggaagcagcctcggccatcgccgaggagctgggctATGACCTTTTGGGTCAGGT	370
PC1u10	PC1	T	A	P	P	cds	GE543	AACTTGTATTTGTTTCATAGGAACT	TTTTTCATCCTCTCATTTACAC	AACTTGTATTTGTTTCATAGGAACTagcactgtgctcttggctgaaagagaacgggatacatctcc[t/a]aatggctttaagaattgggacttcatgtctgttcacacatggggagagaaccctataggtacttggactttgagaattacagacatggtaaGTGTAAATGAGAGGATGAAAAA	184
PC1u2	PC1	C	T	N	N	cds	GE515	TGTCTCTTTAGGATCCAGAGGC	ACACAAATGCATATTTACTCACT	TGTCTCTTTAGGATCCAGAGGCtagctatgattttaatgataatgaccatgatccatttccccgatatgatcccacaaa[c/t]gagaacaAGTGAGTAAATATGCATTTGTGT	114
PC1u3	PC1	A	G	N	D	cds	GE504	CTTATTTTTCAATCCTCAGACA	TAGGGACAATCCTCTGTTTT	CTTATTTTTCAATCCTCAGACAcgggaccagatgtgcaggagaaattgccatgcaagca[a/g]ataatcacaaatgcggggttggagttgcatacaattccaaagttggaggtAAAACAGAGGATTGTCCCTA	134
PC1u4	PC1	T	C	N	N	cds	GE543	AACTTGTATTTGTTTCATAGGAACT	TTTTTCATCCTCTCATTTACAC	AACTTGTATTTGTTTCATAGGAACTagcactgtgctcttggctgaaagagaacgggatacatctcctaatggctttaagaa[t/c]tgggacttcatgtctgttcacacatggggagagaaccctataggtacttggactttgagaattacagacatggtaaGTGTAAATGAGAGGATGAAAAA	184

FIG. 5000000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PC1u5	PC1	C	G	Q	E	cds	GE1236	TAGGAGCAGCCCACACA	CACTTGTGCAGACAGGAA	TAGGAGCAGCCCACACAagagaaccctaaggagaacaccctggtgtccaaaagccccagcagcagcagcgtagggggccggagggatgagttggaggagggagccccttcc[c/g]aggccatgctgcgactcctgcaaagtgctttcagtaaaaactcaccgccaaagcaatcaccaaagaagtccccaagtgcaaagctcaacatcccttatgaaaacttctacgaagccctggaaaagctgaacaaaccttcccagcttaaagactctgaagacagtctgtataatgactatgttgatgtttttataacactaaaccttacaagcacagagacgaccggctgcttcaagctctggtggacattctgaatgaggaaaattaaaataagtgtgtggtcccaagttggaaatattcatgcttcttccttaccctgcgatttgcctgtgtctgaagtggttgttttgtcatgaattcttatgcttataatatcctttgtggcacctttcttttctccctaaactgtacatgtgaaggggatgagctcaagcaggaagttcaacttccagaattgatcataggtatttcaaaacacatctTTCCTGTCTGCACAAGTG	620
PC1u6	PC1	G	C	S	T	cds	GE1236	TAGGAGCAGCCCACACA	CACTTGTGCAGACAGGAA	TAGGAGCAGCCCACACAagagaaccctaaggagaacaccctggtgtccaaaagccccagcagcagcagcgtagggggccggagggatgagttggaggagggagccccttcccaggccatgctgcgactcctgcaaagtgctttcagtaaaaactcaccgccaaagcaatcaccaaagaagtccccaa[g/c]tgcaaagctcaacatcccttatgaaaacttctacgaagccctggaaaagctgaacaaaccttcccagcttaaagactctgaagacagtctgtataatgactatgttgatgtttttataacactaaaccttacaagcacagagacgaccggctgcttcaagctctggtggacattctgaatgaggaaaattaaaataagtgtgtggtcccaagttggaaatattcatgcttcttccttaccctgcgatttgcctgtgtctgaagtggttgttttgtcatgaattcttatgcttataatatcctttgtggcacctttcttttctccctaaactgtacatgtgaaggggatgagctcaagcaggaagttcaacttccagaattgatcataggtatttcaaaacacatctTTCCTGTCTGCACAAGTG	620
PC1u7	PC1	T	G	C	G	cds	GE1233	TTTAGAGCCCTGAAAGCTA	GAAGTAAGTGTGACATGAAGGT	TTTAGAGCCCTGAAAGCTAatggagaagttatcattgaaattccaacaagagct[t/g]gtgaaggacaagaaaatgctatcaagtccctggagcatgtacaatttgaagcaacaattgaatattcccgaagaggagACCTTCATGTCACACTTACTTC	159
PC1u8	PC1	T	G	I	S	cds	GE1212	CTTCACTGAGCGCTCGCC	ACCTGACCCAAAAGGTCAT	CTTCACTGAGCGCTCGCCgccgcccagcctctcctctcgcgcctcctagctcttcgcagagcaaccaggagccaggagtggtctagagcccgagggtgggaagggggagtctgtctggcttttctcctatcttgcttctttttcctcttcccttcccactcttgttcaagcgagtgtgtgagctatggagcgaagagcctggagtctgcagtgcactgctttcgtcctcttttgcgcttggtgtgcactgaacagtgcaaaagcgaaaaggcaatttgtcaatgaatgggcagcggagatccccgggggcccggaagcagcctcggcca[t/g]cgccgaggagctgggctATGACCTTTTGGGTCAGGT	370
PC1u9	PC1	G	A	L	L	cds	GE1236	TAGGAGCAGCCCACACA	CACTTGTGCAGACAGGAA	TAGGAGCAGCCCACACAagagaaccctaaggagaacaccct[g/a]gtgtccaaaagccccagcagcagcagcgtagggggccggagggatgagttggaggagggagccccttcccaggccatgctgcgactcctgcaaagtgctttcagtaaaaactcaccgccaaagcaatcaccaaagaagtccccaagtgcaaagctcaacatcccttatgaaaacttctacgaagccctggaaaagctgaacaaaccttcccagcttaaagactctgaagacagtctgtataatgactatgttgatgtttttataacactaaaccttacaagcacagagacgaccggctgcttcaagctctggtggacattctgaatgaggaaaattaaaataagtgtgtggtcccaagttggaaatattcatgcttcttccttaccctgcgatttgcctgtgtctgaagtggttgttttgtcatgaattcttatgcttataatatcctttgtggcacctttcttttctccctaaactgtacatgtgaaggggatgagctcaagcaggaagttcaacttccagaattgatcataggtatttcaaaacacatctTTCCTGTCTGCACAAGTG	620
PCId11	PCI	T	G	-	-	noncoding	GE334	TATGAATCCAAGGGGTGAGG	GGAATGAAATGGGGTAGAGTAGA	TATGAATCCAAGGGGTGAGGctcagtgtgccaatgccccagaacagtctaagaaagctcctttttcccttttccaggcagctcgagctttaccttcccaaattctccattgagggctcctatcagctggagaaagtcctccccagtctggggatcagtaacgtcttcacctcccatgctgatctgtcccgcatcagcaaccactcaaatatccaggtgtctgaggtgggttcagaagctcctatgcatctgcttcccaagatctattctgttctattctttcta[t/g]TCTACTCTACCCCATTTCATTCC	310

FIG. 5PPPPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCId12	PCI	A	G	-	-	noncoding	GE334	TATGAATCCAAGGGGTGAGG	GGAATGAAATGGGGTAGAGTAGA	TATGAATCCAAGGGGTGAGGctcagtgtgccaatgccccagaacagtctaagaaagctcctttttcccttccaggcagctcgagcttaccttcccaaattctccattgagggctcctatcagctggagaaagtcctccccagtctggggatcagtaacgtcttcacctcccatgctgatctgtcccgcatcagcaaccactcaaatatccaggtgtctgaggtgggttcagaagctcctatgcatctgcttcccaag[a/g]tctattctgttctattctttctatTCTACTCTACCCCATTTCATTCC	310
PCId13	PCI	T	A	-	-	noncoding	GE375	GAAGCTTTGCCATTTGCTATG	GTGTGGGTGGAAGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagccacggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaacaggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtggggcttctcctgaaatctacaggcctcagggtgggagatgaagggggcta[t/a]gctatggcccatctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataatattactctatggaTGATTGCTTCCACCCACAC	423
PCId14	PCI	T	G	V	G	cds	GE375	GAAGCTTTGCCATTTGCTATG	GTGTGGGTGGAAGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagccacggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctag[t/g]gttcaacaggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtggggcttctcctgaaatctacaggcctcagggtgggagatgaagggggctatgctatggcccatctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataatattactctatggaTGATTGCTTCCACCCACAC	423
PCId15	PCI	G	A	-	-	noncoding	GE375	GAAGCTTTGCCATTTGCTATG	GTGTGGGTGGAAGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccct[g/a]gtggcctggtgatgcctggtgtctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagccacggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaacaggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtggggcttctcctgaaatctacaggcctcagggtgggagatgaagggggctatgctatggcccatctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataatattactctatggaTGATTGCTTCCACCCACAC	423
PCId16	PCI	C	T	-	-	noncoding	GE375	GAAGCTTTGCCATTTGCTATG	GTGTGGGTGGAAGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagccacggggacaatcttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaacaggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtggggcttctcctgaaatctacaggcctcagggtgggagatgaagggggctatgctatggcccatctgtatgctggtagctagtgatttacgacaggtttagttgactagatgagg[c/t]attacaaataatattactctatggaTGATTGCTTCCACCCACAC	423

FIG. 5QQQQQQ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCId17	PCI	C	T	N	N	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc agggggcctcccttcaccgccaccaccccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttc cgctgcccccagccagaa[c/t]atcttcttctcccctgtgagcatctccatgagcctggccatg ctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctcca gaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCId18	PCI	C	T	P	P	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc agggggcctcccttcaccgccaccaccccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttc cgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatgctct ccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaa agctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagcccagaga tggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggacacct tcgtaagtgccatgaagacgctgtacctggcagacactttccc[c/t]accaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCIu1	PCI	T	C	F	F	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc agggggcctcccttcaccgccaccaccccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctt[t/c]gacctctacagggccttgg cttccgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatg ctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctcca gaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787

FIG. 5RRRRRR

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCIu10	PCI	G	C	G	R	cds	GE394	TGGCTATCTTTACTGTCTTCACTCC	GTCCTTCCCACCAGTGCTGT	TGGCTATCTTTACTGTCTTCACTCCttttatttgcagctgagaatttctaattctgacacaaattctttttcattttcccttttttcatctttagctaagtgggagacaagcttcaaccacaaa[g/c]gcacccaagagcaagacttctacgtgacctcggagactgtggtgcgggtacccatgatgagccgcgaggatcagtatcactacctcctggaccggaacctctcctgcagggtggtggggtcccctaccaaggcaatgccacggctttgttcattctccccagtgagggaaagatgcagcaggtggagaatggactgagtgagaaaacgctgaggaagtggcttaagatgttcaaaaagaggtactttcagactaccccagggccagcctaaacccacacagccccagggagacacacacgccctaccagggccacACAGCACTGGTGGGAAGGAC	467
PCIu2	PCI	A	G	N	S	cds	GE413	GGACATCTCTGGAAAGTCAGC	TGAGGGAATTGGGTATTCTTTAGAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttcccttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctcagggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgtaggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttccgctgcccccagccaga[a/g]catcttcttctcccctgtgagcatctccatgagcctggccatgctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagcccagagatggcttccagctgagcctcggcaatgccctttttcaccgacctggtggtagacctgcaggacaccttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactctgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggacttgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaaggcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAATTCCCTCA	787
PCIu3	PCI	C	A	I	I	cds	GE375	GAAGCTTTGCCATTTGCTATG	GTGTGGGTGGAAGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagccacggggacaat[c/a]ttcactttcaggtcggcccgcctgaactctcagaggctagtgttcaacaggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtggggcttctcctgaaatctacaggcctcagggtgggagatgaagggggctatgctatggcccatctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataatattactctatggaTGATTGCTTCCACCCACAC	423
PCIu4	PCI	G	A	S	S	cds	GE375	GAAGCTTTGCCATTTGCTATG	GTGTGGGTGGAAGCAATCA	GAAGCTTTGCCATTTGCTATGatgacttcacctgcccctggtggcctggtgatgcctggtgtctcccctgcagatggtgcacaaagctgtggtggaggtggacgagtcgggaaccagagcagcggcagccacggggacaatcttcactttcaggtc[g/a]gcccgcctgaactctcagaggctagtgttcaacaggccctttctgatgttcattgtggataacaacatcctcttccttggcaaagtgaaccgcccctgaggtggggcttctcctgaaatctacaggcctcagggtgggagatgaagggggctatgctatggcccatctgtatgctggtagctagtgatttacgacaggtttagttgactagatgaggcattacaaataatattactctatggaTGATTGCTTCCACCCACAC	423

FIG. 5SSSSSS

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCIu5	PCI	C	T	A	V	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc agggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacaggg[c/t]cttgg cttccgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatg ctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctcca gaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCIu6	PCI	A	G	K	E	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc agggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttc cgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatgctct ccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaa agctcagag[a/g]aggagctgcacagaggctttcagcagctccttcaggaactcaaccagccca gagatggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggac accttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactc tgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggact tgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787
PCIu7	PCI	T	A	F	I	cds	GE413	GGACATCTCTG GAAAGTCAGC	TGAGGGAATTG GGTATTCTTTA GAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttccct ttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctc agggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgta ggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttc cgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatgctct ccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaa agctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccagcccagaga tggcttccagctgagcctcggcaatgccctttcaccgacctggtggtagacctgcaggacacct tcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactctgca ggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggacttgct taagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttc[t/a]ttaaaggtaag gcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAAT TCCCTCA	787

FIG. 5TTTTTT

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PCIu8	PCI	C	G	A	G	cds	GE394	TGGCTATCTTTACTGTCTTCACTCC	GTCCTTCCCACCAGTGCTGT	TGGCTATCTTTACTGTCTTCACTCCtttatttgcagctgagaatttctaattctgacacaaattctttttcatttttccctttttcatctttag[c/g]taagtgggagacaagcttcaaccacaaaggcacccaagagcaagacttctacgtgacctcggagactgtggtgcgggtacccatgatgagccgcgaggatcagtatcactacctcctggaccggaacctctcctgcagggtggtggggtcccctaccaaggcaatgccacggctttgttcattctccccagtgagggaaagatgcagcaggtggagaatggactgagtgagaaaacgctgaggaagtggcttaagatgttcaaaaagaggtactttcagactaccccagggccagcctaaacccacacagccccagggagacacacacgccctaccagggccacACAGCACTGGTGGGAAGGAC	467
PCIu9	PCI	C	G	P	A	cds	GE413	GGACATCTCTGGAAAGTCAGC	TGAGGGAATTGGGTATTCTTTAGAT	GGACATCTCTGGAAAGTCAGCacctggaccagctccacccctctctgaggacaccttctttcccttcagaacaaagaacagccaccatgcagctcttcctcctcttgtgcctggtgcttctcagccctcagggggcctcccttcaccgccaccacccccgggagatgaagaagagagtcgaggacctccatgtaggtgccacggtggcccccagcagcagaagggactttacctttgacctctacagggccttggcttccgctgcccccagccagaacatcttcttctcccctgtgagcatctccatgagcctggccatgctctccctgggggctgggtccagcacaaagatgcagatcctggagggcctgggcctcaacctccagaaaagctcagagaaggagctgcacagaggctttcagcagctccttcaggaactcaaccag[c/g]ccagagatggcttccagctgagcctcggcaatgccctttttcaccgacctggtggtagacctgcaggacaccttcgtaagtgccatgaagacgctgtacctggcagacactttccccaccaactttagggactctgcaggggccatgaagcagatcaatgattatgtggcaaagcaaacgaagggcaagattgtggacttgcttaagaacctcgatagcaatgcggtcgtgatcatggtgaattacatcttctttaaaggtaaggcccttgggcccaaacctgcactttctttggcttttctgctgcttttATCTAAAGAATACCCAATTCCCTCA	787
PRLd5	PRL	G	A	-	-	noncoding	GE523	ACTTCCAGATCTTCTCTGGTG	CCCCACAGGAGTGTTGATACA	ACTTCCAGATCTTCTCTGGTGaagtgtgtttcctgcaacgatcacaaacatgaacatcaaaggatcgccatggaaaggtatgtgtgacaactcactgcgttgttg[g/a]tTGTATCAACACTCCTGTGGGG	132
PRLd6	PRL	C	T	R	*	cds	GE600	CCCCATTGTATTTTACCTATTTT	TCACCGCTTATATTAATGAGAAAAAC	CCCCATTGTATTTTACCTATTTTaatgcaattgttctatatggtttcgtagcaaaaagactttctgagcctgatagtcagcatattg[c/t]gatcctggaatgagcctctgtatcatctggtcacggaagtacgtggtatgcaagaagccccggaggctatcctatccaaagctgtagagattgaggagcaaaccaaacggcttctagagggcatggagctgatagtcagccaggtgagcagcctcttggtgcttctttGTTTTTCTCATTAATATAAGCGGTGA	286
PRLu1	PRL	A	C	N	H	cds	GE631	ACAGTTAGAAAGAACAAGGACA	GATCATTAAGGACCTTCTCAG	ACAGTTAGAAAGAACAAGGACAtacaaatactaataatatgaagaataagtcactctttttttgtgtgattaggttcatcctgaaaccaaagaaaatgagatctaccctgtctggtcgggacttccatccctgcagatggctgatgaagagtctcgcctttctgcttattataacctgctccactgcctacgcagggattcacataaaatcgacaattatctcaagctcctgaagtgccgaatcatccacaac[a/c]acaactgctaagcccacatccatttcatctatttCTGAGAAGGTCCTTAATGATC	313
PRLu2	PRL	A	T	K	N	cds	GE600	CCCCATTGTATTTTACCTATTTT	TCACCGCTTATATTAATGAGAAAAAC	CCCCATTGTATTTTACCTATTTTaatgcaattgttctatatggtttcgtagcaaaa[a/t]gactttctgagcctgatagtcagcatattgcgatcctggaatgagcctctgtatcatctggtcacggaagtacgtggtatgcaagaagccccggaggctatcctatccaaagctgtagagattgaggagcaaaccaaacggcttctagagggcatggagctgatagtcagccaggtgagcagcctcttggtgcttctttGTTTTTCTCATTAATATAAGCGGTGA	286
PRLu3	PRL	G	A	E	E	cds	GE631	ACAGTTAGAAAGAACAAGGACA	GATCATTAAGGACCTTCTCAG	ACAGTTAGAAAGAACAAGGACAtacaaatactaataatatgaagaataagtcactctttttttgtgtgattaggttcatcctgaaaccaaagaaaatgagatctaccctgtctggtcgggacttccatccctgcagatggctgatgaaga[g/a]tctcgcctttctgcttattataacctgctccactgcctacgcagggattcacataaaatcgacaattatctcaagctcctgaagtgccgaatcatccacaacaacaactgctaagcccacatccatttcatctatttCTGAGAAGGTCCTTAATGATC	313

FIG. 5UUUUUU

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PRLu4	PRL	G	A	V	V	cds	GE613	TCCGTGGAATAAATCATCTCAG	CAGTAGTTCATGTGAAGGCTCC	TCCGTGGAATAAATCATCTCAGagtggctcgcgttcttatttaagcagggtccctcctgctgctg ctggtgtcaaacctgctgctgtgccagagcgt[g/a]gccccttgcccatctgtcccggcgggg ctgcccgatgccaggtgacccttcgagacctgtttgaccgcgccgtcgtcctgtcccactacatc cataacctctcctcagaaatgttcagcgaattcgtaagtaccatgcttctggcttcctccctgaa GGAGCCTTCACATGAACTACTG	282
PROS1u 1	PROS1	A	T	K	M	cds	GE935	TATAAACTGATTGTTTCCTTCAG	GGAAATGTTCAGTCTGTAGTTGTATGTC	TATAAACTGATTGTTTCCTTCAGtttgtcaa[a/t]gcaacaggcttcacaagtcctggttagg aagcgtcgtgcaaattctttacttgaagaaaccaaacagggtaatcttgaaagagaatgcatcga agaactgtgcaataaagaagaagccagggaggtctttgaaaatgacccggaaacggtaagcattt atggaaactatcaagttcacacatctaGACATACAACTACAGACTGAACATTTCC	250
PROS1u 10	PROS1	A	G	R	R	cds	GE280	CCTGCTCTTCAGGATATTCTGTTAT	TGGAAGGCCACCCAGGTAT	CCTGCTCTTCAGGATATTCTGTTATctgttgaaaatactgtaatatatcggatacaggccctaag tctatgttccgatcaacaatctcatctggaatttagagtcaacag[a/g]aacaatctggagttg tcgacaccacttaaaatagaaaccatctcccatgaagaccttcaaagacaacttgccgtcttgga caaagcaatgaaagcaaaagtggccacATACCTGGGTGGCCTTCCA	241
PROS1u 11	PROS1	A	T	T	S	cds	GE277	CACACAATTTTATTTTTCCATGAC	TGCAGAGAACTTTTCAGGAGA	CACACAATTTTATTTTTCCATGACatgagataaaaaaaataaatagatgtctatttccttcagcc attccagaccagtgtagtcctctgccatgcaatgaagatggatatatgagctgcaaagatggaaa agcttctttt[a/t]cttgcacttgtaaaccaggttggcaaggagaaaagtgtgaatttggtacg tataataaccccgcccccagctcatcaggattggTCTCCTGAAAAGTTCTCTGCA	252
PROS1u 2	PROS1	T	A	C	*	cds	GE277	CACACAATTTTATTTTTCCATGAC	TGCAGAGAACTTTTCAGGAGA	CACACAATTTTATTTTTCCATGACatgagataaaaaaaataaatagatgtctatttccttcagcc attccagaccagtgtagtcctctgccatgcaatgaagatggatatatgagctgcaaagatggaaa agcttcttttacttgcacttg[t/a]aaaccaggttggcaaggagaaaagtgtgaatttggtacg tataataaccccgcccccagctcatcaggattggTCTCCTGAAAAGTTCTCTGCA	252
PROS1u 3	PROS1	T	C	C	R	cds	GE262	ATAAGATTGAACATTTAGGGGATATTA	CATTTTAGAAACAGGTGAGAAGTTA	ATAAGATTGAACATTTAGGGGATATTAaagtttgtgtgcgtgtgtttttttacctcagatatag atgaa[t/c]gctctgagaacatgtgtgctcagctttgtgtcaattaccctggaggttacacttg ctattgtgatgggaagaaaggattcaaacttgcccaagatcagaagagttgtgaggtaaacattt tacaatgctTAACTTCTCACCTGTTTTCTAAAATG	230
PROS1u 4	PROS1	A	G	P	P	cds	GE317	AAACAAGATGCTAAAAGTCTTGGA	AAACCCTTCAGCTGTTATTGAAAC	AAACAAGATGCTAAAAGTCTTGGActaatattctaatatttccttttacagatgttccattcag tgccacaccagtgaatgccttttataatggctgcatggaagtgaatattaatggtgtacagttgg atctggatgaagccatttctaaacataatgatattagagctcactcatgtcc[a/g]tcagtttg gaaaaagacaaagaattcttaaggcatcttttctctgcttataataccttttccttgtgtgtaat tatacttatGTTTCAATAACAGCTGAAGGGTTT	293
PROS1u 5	PROS1	T	C	Y	Y	cds	GE262	ATAAGATTGAACATTTAGGGGATATTA	CATTTTAGAAACAGGTGAGAAGTTA	ATAAGATTGAACATTTAGGGGATATTAaagtttgtgtgcgtgtgtttttttacctcagatatag atgaatgctctgagaacatgtgtgctcagctttgtgtcaattaccctggaggttacacttgcta[t/c]tgtgatgggaagaaaggattcaaacttgcccaagatcagaagagttgtgaggtaaacattt tacaatgctTAACTTCTCACCTGTTTTCTAAAATG	230
PROS1u 6	PROS1	A	G	T	A	cds	GE918	TCGAGCCACTGTTTAAGTTT	AGATACTCAATAATGTTTCACAAATAA	TCGAGCCACTGTTTAAGTTTaaaatgcactccttgacttgtattttaatttgttagattaaccct cgtctagatggatgtatacgaagctggaatttgatgaagcaaggagcttctggaataaaggaaat tattcaagaaaaacaaaataagcattgcctggtt[a/g]ctgtggagaagggctcctactatcct ggttctggaattgctcaatttcacatagattatagtaagtgattttccatttatctctatttctct cattaatgagtaaatttattcattaacaaacagtaataatTTATTTGTGAAACATTATTGAGTAT CT	327

FIG. 5VVVVVV

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PROS1u 7	PROS1	G	A	E	K	cds	GE918	TCGAGCCACTGTTTAAGTTT	AGATACTCAATAATGTTTCACAAATAA	TCGAGCCACTGTTTAAGTTTaaaatgcactccttgacttgtatttaatttgttagattaaccctcgtctagatggatgtatacgaagctggaatttgatgaagcaaggagcttctggaataaag[g/a]aaattattcaagaaaaacaaaataagcattgcctggttactgtggagaagggctcctactatcctggttctggaattgctcaatttcacatagattatagtaagtgattttccatttatctctatttttctcattaatgagtaaatttattcattaacaaacagtaataatTTATTTGTGAAACATTATTGAGTATCT	327
PROS1u 8	PROS1	T	G	L	R	cds	GE280	CCTGCTCTTCAGGATATTCTGTTAT	TGGAAGGCCACCCAGGTAT	CCTGCTCTTCAGGATATTCTGTTATctgttgaaaatactgtaatatatcggatacaggccctaagtctatgttccgatcaacaatctcatc[t/g]ggaatttagagtcaacagaaacaatctggagttgtcgacaccacttaaaatagaaaccatctcccatgaagaccttcaaagacaacttgccgtcttggacaaagcaatgaaagcaaaagtggccacATACCTGGGTGGCCTTCCA	241
PROS1u 9	PROS1	T	C	Y	Y	cds	GE277	CACACAATTTTATTTTTCCATGAC	TGCAGAGAACTTTTCAGGAGA	CACACAATTTTATTTTTCCATGACatgagataaaaaaaataaatagatgtctatttccttcagccattccagaccagtgtagtcctctgccatgcaatgaagatggata[t/c]atgagctgcaaagatggaaaagcttcttttacttgcacttgtaaaccaggttggcaaggagaaaagtgtgaatttggtacgtataataacccccgcccccccagctcatcaggattggTCTCCTGAAAAGTTCTCTGCA	252
PTHd3	PTH	G	A	-	-	noncoding	GE1224	AAGCTTCTCGTGAAAACCAAC	AGAGAGGGCCACTTCCCA	AAGCTTCTCGTGAAAACCAACccaattagttagtattgcattctgtgtactatagtttggaatattaaaaatatttaaaatacctccatttgcttatccttttagtgaagatgatacctgcaaaagacatggctaaagttatgattgtcatgttggcaatttgttttcttacaaaatcggatgggaaatctgttaagtaagtactgttttgccttggaattggattttaatgttgactttatcatttc[g/a]aagtggggagctaaTGGGAAGTGGCCCTCTCT	288
PTHLHa 23	PTHLH	T	C	-	-	noncoding	GE651	GAAAACTAACCTGTTTTCTCCTTTTC	TTCCTTCTACTAAAAATCTTAAAGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttcttttgcaggaggcattgaaatttcagcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaaatatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatgaaactgcacattggtcattgtgaatatttttttttttgccaaggctaatccaattattattatcacatttaccataatttattttgtccattgatgtatttattttgtaaatgtatcttggtgctgctgaatttctatatttttttgtaacataatgcactttagatatacatatcaagtatgttgataaatgacacaatgaagtgtctctatttttgtggttgattttaatgaatgcctaaatataattatccaaattgattt[t/c]cctttgtgcatgtaaaaataacagtattttaaatttgtaaagaatgtctaataaaatataatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHd 16	PTHLH	A	T	-	-	noncoding	GE1328	AGTAGTGCGGGGAGATGGAG	CAGCTTGGCAGCCCCTC	AGTAGTGCGGGGAGATGGAGagtcc[a/t]gactgacactcgggtcccattcccttctgttgcaggtcccgagcgcgagcggagacgatgcagcggagactggttcagcagtggagcgtcgcggtgttcctgctgagctacgcggtgccctcctgcgggcgctcggtggagggtctcagccgccgcctgtaagtgccccatcctccccagggcgccgggttggggaggccaggggGAGGGGCTGCCAAGCTG	252
PTHLHd 17	PTHLH	A	G	-	-	noncoding	GE634	GAGGAGGTAGACAGACAGCTATGTA	CTCCCAAGTTGAAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaagggcctggttcgcaaagaagctgacttcagagggggaaactttcttcttttaggaggcggttagccctgttccacgaacccaggagaactgctggccagattaattagacattgctatgggagacgtgtaaacacact[a/g]cttatcattgatgcatatataaaccatttttattttcgctattatttcagaggaagcgcctctgatttgtttcttttttcccttttttgctctttctggctgtgtggtttggagaaagcacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCTTTTCAACTTGGGAG	404

FIG. 5WWWWWWW

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHd 18	PTHLH	T	C	-	-	noncoding	GE634	GAGGAGGTAGACAGACAGCTATGTA	CTCCCAAGTTGAAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaagggcctggttcgcaaagaagctgacttcagaggggaaactttcttcttttaggaggcggttagccctgttccacgaacccaggagaactgctggccagattaattagacattgctatgggagacgtgtaaacacactacttatcattgatgcatatataaaaccatttatttcgctattatttcagaggaagcgcctctgatttgtttctttttccctt[t/c]tgctctttctggctgtgtggtttggagaaagcacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCTTTTCAACTTGGGAG	404
PTHLHd 19	PTHLH	G	A	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagca[g/a]tacccccctaccacacacacccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttatttaattaaatgtatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgccttaaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHd 20	PTHLH	C	T	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacacccctgtcctccagcaccatagaggcg[c/t]tagagcccattcctctttctccaccgtcacccaacatcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttatttaattaaatgtatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgccttaaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHd 21	PTHLH	G	A	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtacccccctaccacacacacccctgtcctccagcaccatagaggcgctaga[g/a]cccattcctctttctccaccgtcacccaacatcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttatttaattaaatgtatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgccttaaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683

FIG. 5XXXXXX

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHd 22	PTHLH	T	C	-	-	noncoding	GE679	TTCTTTATCGA TGCATTTCCAT T	AGAAACATATC CCCCTAGATAG A	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttcttttcactttcagtacagcacttct gtggggtttgaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatctcat tatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggattatag gatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaaccca tcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaatgggc agtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatctcta aagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagataggatcc taactgtatatatttataactaatgtaaggaccctactttattgccaaaacctattttttatccat tgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatatagta aacattcaataaattgcaacatattatttggtgttttagacctagttctgattgtatcctcta cctatcatctatc[t/c]atttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu 1	PTHLH	T	C	-	-	noncoding	GE634	GAGGAGGTAGA CAGACAGCTAT GTA	CTCCCAAGTTG AAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaa gggcc[t/c]ggttcgcaaagaagctgacttcagagggggaaactttcttcttttaggaggcggt tagccctgttccacgaacccaggagaactgctggccagattaattagacattgctatgggagacg tgtaaacacactacttatcattgatgcatatataaaaccatttattttcgctattatttcagag gaagcgcctctgatttgtttcttttttccctttttgctctttctggctgtgtggtttggagaaag cacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCT TTTCAACTTGGGAG	404
PTHLHu 10	PTHLH	C	G	-	-	noncoding	GE669	GCAATTGACAG AGAATAACTCA GAATA	TGTCATTATTA CCTCAATCTGT G	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtaccccccctaccacacacac ccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatc aatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcata atttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttt tcatttctta[c/g]gttctttcacttcaagggagaatatagaagcatttgatattatctacaaa cactgcagaacagcatcatgtcataaacgattctgagccattcacactttttatttaattaaatg tatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgcct taaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaa aatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaa gatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHu 11	PTHLH	T	G	-	-	noncoding	GE669	GCAATTGACAG AGAATAACTCA GAATA	TGTCATTATTA CCTCAATCTGT G	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtaccccccctaccacacacac ccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatc aatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcata atttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttt tcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacact gcagaacagcatcatgtcataaacgattctgagccattcacactttttatttaattaaatgtatt taattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgccttaaa tttg[t/g]ttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaa aatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaa gatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683

FIG. 5YYYYYY

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHu 12	PTHLH	A	G	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtaccccctaccacacacac ccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatc aatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcata atttgctggagaagtgtatttcttccccttactctcacacctgggcaaactttcttcagtgtttt tcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacact gcagaacagcatcatgtcataaacgattctgagccattcacactttttatttaattaaatgtatt taattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgccttaaa tttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatg tttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaagatg aaataatttttctagggta[a/g]tgccgtagaaaaataaaacttcacatttatgtggcttgttt atccttagctCACAGATTGAGGTAATAATGACA	683
PTHLHu 13	PTHLH	T	C	-	-	noncoding	GE679	TTCTTTATCGATGCATTTCCATT	AGAAACATATCCCCCTAGATAGA	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttcttttcactttcagtacagcacttct gtggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatctcat tatttaagagtcccctgttacttctttagtcatttcc[t/c]ttgactctgctacagataggatt ataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaa cccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaat gggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatc tctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagatagg atcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttat ccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatat agtaaacattcaataaattgcaacatattattttggtgttttagacctagttctgattgtatcc tctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu 14	PTHLH	G	T	-	-	noncoding	GE651	GAAAACTAACCTGTTTTCTCCTTTTC	TTCCTTCTACTAAAAATCTTAAAGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttcttttgcaggaggcattgaaatttc agcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaa atatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatga aactgcacattggtcattgtgaatattttttttttgccaaggctaatccaattattattatcac atttaccataatttattttgtccattgatgtatttattttgtaaatgtatcttg[g/t]tgctgc tgaatttctatatttttgtaacataatgcactttagatatacatatcaagtatgttgataaatg acacaatgaagtgtctctatttgtggttgattttaatgaatgcctaaatataattatccaaatt gattttcctttgtgcatgtaaaaataacagtattttaaatttgtaaagaatgtctaataaaatat aatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHu 15	PTHLH	C	A	Y	*	cds	GE679	TTCTTTATCGATGCATTTCCATT	AGAAACATATCCCCCTAGATAGA	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttcttttcactttcagta[c/a]agcac ttctgtggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatc tcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggatt ataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaa cccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaat gggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatc tctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagatagg atcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctatttttat ccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatat agtaaacattcaataaattgcaacatattattttggtgttttagacctagttctgattgtatcc tctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706

FIG. 5ZZZZZZZ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHu 2	PTHLH	A	T	-	-	noncoding	GE679	TTCTTTATCGATGCATTTCCATT	AGAAACATATCCCCCTAGATAGA	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttcttttcactttcagtacagcacttctgtggggtttgaaaaaaaaaaaggaaaacaacagaagaacacatcatatgcaactaatgatctcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggattataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaacccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaatgggcagtggcactagaa[a/t]aatcttgagcacagtgaatgacctatcctgcaaacatctaatggatctctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagataggatcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctattttatccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatatagtaaacattcaataaattgcaacatattatttggtgttttagacctagttctgattgtatcctctacctatcatctatctatttatatctatctaTCTATCTAGGGGGATATGTTTCT	706
PTHLHu 3	PTHLH	T	G	-	-	noncoding	GE651	GAAAACTAACCTGTTTTCTCCTTTTC	TTCCTTCTACTAAAAATCTTAAAGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttcttttgcaggaggcattgaaatttcagcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaaatatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatgaaactgcacattggtcattgtgaatattttttttttgccaaggctaatccaattattattatcacatttaccataatttattttgtccattgatgtatttattttgtaaatgtatcttgg[t/g]gctgctgaatttctatatttttgtaacataatgcactttagatatacatatcaagtatgttgataaatgacacaatgaagtgtctctatttgtggttgattttaatgaatgcctaaatataattatccaaattgattttcctttgtgcatgtaaaaataacagtattttaaatttgtaaagaatgtctaataaaatataatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHu 4	PTHLH	A	G	-	-	noncoding	GE651	GAAAACTAACCTGTTTTCTCCTTTTC	TTCCTTCTACTAAAAATCTTAAAGGATAG	GAAAACTAACCTGTTTTCTCCTTTTCtttctcttccttcttttgcaggaggcattgaaatttcagcagagaccttccaaggacatattgcaggattctgtaatagtgaacatatggaaagtattagaaatatttattgtctgtaaatactgtaaatgcattggaataaaactgtctcccccattgctctatgaaactgcacattggtcattgtgaatattttttttttgccaaggctaatccaattattattatcacatttaccataatttattttgtccattgatgtatttattttgtaaatgtatcttggtgctgctgaatttctatatttttgtaacataatgcactttagatatacatatcaagtatgttgataaatgacacaatgaagtgtctctatttgtggttgattttaatgaatgcctaaatataattatccaaattgattttcctttgtgcatgtaaaaata[a/g]cagtattttaaatttgtaaagaatgtctaataaaatataatctaattacatcatgattcagagagtgaattCTATCCTTTAAGATTTTTAGTAGAAGGAA	582
PTHLHu 5	PTHLH	C	G	L	L	cds	GE1328	AGTAGTGCGGGGAGATGGAG	CAGCTTGGCAGCCCCTC	AGTAGTGCGGGGAGATGGAGagtccagactgacactcgggtcccattcccttctgttgcaggtcccgagcgcgagcggagacgatgcagcggagactggttcagcagtggagcgtcgcggtgttcctgctgagctacgcggtgccctcctgcgggcgctcggtggagggtct[c/g]agccgccgcctgtaagtgccccatcctccccagggcgccgggttggggaggccaggggGAGGGGCTGCCAAGCTG	252
PTHLHu 6	PTHLH	A	G	-	-	noncoding	GE669	GCAATTGACAGAGAATAACTCAGAATA	TGTCATTATTACCTCAATCTGTG	GCAATTGACAGAGAATAACTCAGAATAttgtctgccttaaagcagtaccccccctaccacacacacccctgtcctccagcaccatagaggcgctagagcccattcctctttctccaccgtcacccaacatcaatcctttaccactctaccaaataatttcatattcaagcttcagaagctagtgaccatcttcataatttgctggagaagtgt[a/g]tttcttccccttactctcacacctgggcaaactttcttcagtgtttttcatttcttacgttctttcacttcaagggagaatatagaagcatttgatattatctacaaacactgcagaacagcatcatgtcataaacgattctgagccattcacacttttttatttaattaaatgtatttaattaaatctcaaatttattttaatgtaaagaacttaaattatgttttaaacacatgccttaaatttgtttaattaaatttaactctggtttctaccagctcatacaaaataaatggtttctgaaaatgtttaagtattaacttacaaggatataggtttttctcatgtattctttttgttcattggcaagatgaaataatttttctagggtaatgccgtagaaaaataaaacttcacatttatgtggcttgtttatccttagctCACAGATTGAGGTAATAATGACA	683

FIG. 5AAAAAAA

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
PTHLHu 7	PTHLH	A	G	K	R	cds	GE679	TTCTTTATCGATGCATTTCCATT	AGAAACATATCCCCTAGATAGA	TTCTTTATCGATGCATTTCCATTgaaatgatttttttttcttttcactttcagtacagcacttctgtggggtttgaaaaaaaaaaaggaaaacaacaga[a/g]gaacacatcatatgcaactaatgatctcattatttaagagtcccctgttacttctttagtcatttcctttgactctgctacagataggattataggatgatgcttcaaagggaccttgaacctattcaccattatttgtctctttccgctggcaaacccatcattaaatagcacataaaatagcaatcatatggataagtagtacagcttcagtaatcaatgggcagtggcactagaaaaatcttgagcacagtgaatgacctatcctgcaaacatctaatggatctctaaagggtaacaaaccctataaattctggcttactgcacatatttagtgtgttttaagataggatcctaactgtatatatttataactaatgtaaggaccctactttattgccaaaacctattttatccattgtctcatatatataaactagtcatatatataaacatatatatataaacatatatgtatatagtaaacattcaataaattgcaacatattatttggtgtttttagacctagttctgattgtatcctctacctatcatctatctatttatatctatctaTCTATCTAGGGGATATGTTTCT	706
PTHLHu 8	PTHLH	T	A	-	-	noncoding	GE634	GAGGAGGTAGACAGACAGCTATGTA	CTCCCAAGTTGAAAAGAAAAA	GAGGAGGTAGACAGACAGCTATGTAtatatatgtgggtttcgctacaagtggctctggaacgaaagggcctggttcgcaaagaagctgacttcagaggggaaactttcttcttttaggaggcggttagccctgttccacgaacccaggagaac[t/a]gctggccagattaattagacattgctatgggagacgtgtaaacacactacttatcattgatgcatatataaaaccatttttattttcgctattatttcagaggaagcgcctctgatttgtttcttttttcccttttgctctttctggctgtgtggtttggagaaagcacagttggagtagccggttgctaaataagtaagtgctgagaggctccagagaaatttTTTTTCTTTTCAACTTGGGAG	404
PTHLHu 9	PTHLH	G	A	E	K	cds	GE662	ATTGTCTCTATCAGCAACTAAAAT	AGGGGTGTGTGTGGTAGGG	ATTGTCTCTATCAGCAACTAAAATttaactgtttcttcccctctaatattttctttcaaagcaaaagagctgtgtct[g/a]aacatcagctcctccatgacaaggggaagtccatccaagatttacggcgacgattcttccttcaccatctgatcgcagaaatccacacagctgaaatcagagcgaccgcggagggggccccgaacgccaagcccgcgcccaacacaaagaaccaccccgtccgatttgggtctgatgatgagggcagatacctaactcaggaaactaacaaggtggagacgtacaaagagcagccgctcaagacacctgggaagaaaaagaaaggcaagcccgggaaacgcaaggagcaggaaaagaaaaaacggcgaactcgctctgcctggttagactctggagtgactgggagtgggctagaaggggaccacctgtctgacacctccacaacgtcgctggagctcgattcacggtaacaggcttctctggcccgtagcctcagcggggtgctctcagctgcctcccttctgccttggcttggacaaacctagaatttctccctttatgtatctctatcgattgtgtagcaattgacagagaataactcagaatattgtctgccttaaagcagtacccCCCTACCACACACACCCCT	673
PTHu1	PTH	A	G	-	-	noncoding	GE1224	AAGCTTCTCGTGAAAACCAAC	AGAGAGGGCCACTTCCCA	AAGCTTCTCGTGAAAACCAACccaattagttagtattgcattctgtgtactatagtttggaatattaaaaatatttaaaatacctccatttgctt[a/g]tcctttagtgaagatgatacctgcaaaagacatggctaaagttatgattgtcatgttggcaatttgttttcttacaaaatcggatgggaaatctgttaagtaagtactgttttgccttggaattggattttaatgttgactttatcatttcgaagtggggagctaaTGGGAAGTGGCCCTCTCT	288
PTHu2	PTH	C	A	R	R	cds	GE1210	CATTTCGAAGTGGGGAGCTA	CATGTATTGTTGCCCTACACTG	CATTTCGAAGTGGGGAGCTAatgggaagtggccctctctgtttctcttcttcccaggaagagatctgtgagtgaaatacagcttatgcataacctgggaaaacatctgaactcgatggagagagtagaatggctgcgtaagaagctgcaggatgtgcacaatttgttgcccttggagctcctctagctcccagagatgctggttcccagaggccc[c/a]gaaaaaggaagacaatgtcttggttgagagccatgaaaaagtcttggagaggcagacaaagctgatgtgaatgtattaactaaagctaaatcccagtgaaaatgaaaacagatattgtcagagttctgctctagaCAGTGTAGGGCAACAATACATG	380
SELPd2 3	SELP	C	T	T	T	cds	GE452	CAGCTGTGAAATGCTCAGA	AAAATTGTACCTTGGCAGG	CAGCTGTGAAATGCTCAGAactacatgttaataagccaatagcgatgaactgctccaacctctggggaaacttcagttatggatcaatctgctctttccattgtctagagggccagttacttaatggctctgcacaaacagcatgccaagagaatggccactggtcaactac[c/t]gtgccaaCCTGCCAAGGTACAATTTT	203

FIG. 5BBBBBBB

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SELPd24	SELP	C	T	P	L	cds	GE954	TGCCCACCCCTGAAGAT	GGGCTGGGGCTGTCCAT	TGCCCACCCCTGAAGATtcctgaacgaggaaacatgatctgccttcattctgcaaaagcattccagcatcagtctagctgcagcttcagttgtgaagagggatttgcattagttggac[c/t]ggaagtggtgcaatgcacagcctcgggggtATGGACAGCCCCAGCCC	170
SELPd25	SELP	G	A	V	M	cds	GE446	CTCCTGCAGTGAGAGAGTG	CACTGTGGAGGCTTATTTG	CTCCTGCAGTGAGAGAGTGtggagaacttgagctccctcaacac[g/a]tgctcatgaactgcagccaccctctgggaaacttctcttttaactcgcagtgcagcttccactgcactgacgggtaccaagtaaatgggcccagcaagctggaatgcttggcttctggaatctggaCAAATAAGCCTCCACAGTG	194
SELPu1	SELP	A	C	N	T	cds	GE462	TACTCTAGCCATCAAGTGCC	ATATTATTACCTTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgacactcgtggagaattcaatgttggctccacctgtcatttctcttgtaaca[a/c]tggctttaagctggagggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCAAAGGTAATAATAT	208
SELPu10	SELP	A	G	T	A	cds	GE466	TCTCTCCAGCTGTGCAGT	AAAATCCTACCCTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccagtgaagga[a/g]ccatggactgtgttcatccgctcactgcttttgcctatggctccagctgcaaatttgagtgccagcccggctacagagtgaggggcttggacatgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGTGAGGGTAGGATTTT	209
SELPu11	SELP	T	C	T	T	cds	GE462	TACTCTAGCCATCAAGTGCC	ATATTATTACCTTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgacac[t/c]cgtggagaattcaatgttggctccacctgtcatttctcttgtaacaatggctttaagctggagggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCAAAGGTAATAATAT	208
SELPu12	SELP	A	G	N	D	cds	GE462	TACTCTAGCCATCAAGTGCC	ATATTATTACCTTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgacactcgtggagaattcaatgttggctccacctgtcatttctcttgt[a/g]acaatggctttaagctggagggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCAAAGGTAATAATAT	208
SELPu13	SELP	A	G	T	T	cds	GE421	TTTGTAGCAGGACCATTGA	TCCTATTTACCTTTTTGTCTGA	TTTGTAGCAGGACCATTGActatccaggaagccctgacttactttggtggagcggtggcttctac[a/g]ataggtctgataatgggtgggacgctcctggctttgctaagaaagcgttTCAGACAAAAAGGTAAATAGGA	141
SELPu14	SELP	G	A	P	P	cds	GE483	AACCAGAAAGAAGTGGCAG	AAGGCCCTACCTGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatactcatggaatatttcccgtaaatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaattgattacctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaataagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgataatgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtcc[g/a]tcagcccctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGCCTT	393
SELPu15	SELP	T	C	F	S	cds	GE466	TCTCTCCAGCTGTGCAGT	AAAATCCTACCCTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccagtgaaggaaccatggactgtgttcatccgctcactgctt[t/c]tgcctatggctccagctgcaaatttgagtgccagcccggctacagagtgaggggcttggacatgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGTGAGGGTAGGATTTT	209
SELPu16	SELP	C	T	S	F	cds	GE445	ATCCCTTAGCTTTGCAGTG	ACACTCTTACCTTGGCATTC	ATCCCTTAGCTTTGCAGTGccaggatctcccagttccaaatgaggcccgggtgaactgctcccaccccttcggtgcctttaggtaccagtcagtctgcagcttcacctgcaatgaaggcttgctcctggtgggagcaagtgtgctacagtgcttggctactggaaactggaatt[c/t]tgttcctccaGAATGCCAAGGTAAGAGTGT	209

FIG. 5CCCCCCC

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SELPu17	SELP	C	T	D	D	cds	GE454	TCCACTTAGCTATTTCGTGTG	ACAGTACCTTGACAGACTGGG	TCCACTTAGCTATTTCGTGTGagccgctggagagtcctgtccacggaagcatggattgctctccatccttgagagcgtttcagtatga[c/t]accaactgtagcttccgctgtgctgaaggtttcatgctgagaggagccgatatagttcggtgtgataacttgggacagtggacagcaccagcCCCAGTCTGTCAAGGTACTGT	206
SELPu18	SELP	A	T	S	C	cds	GE446	CTCCTGCAGTGAGAGAGTG	CACTGTGGAGGCTTATTTG	CTCCTGCAGTGAGAGAGTGtggagaacttgagctccctcaacacgtgctcatgaactgcagccaccctctgggaaacttctcttttaactcgcagtgcagcttccactgcactgacgggtaccaagtaaatgggccc[a/t]gcaagctggaatgcttggcttctggaatctggaCAAATAAGCCTCCACAGTG	194
SELPu19	SELP	G	A	S	N	cds	GE466	TCTCTCCAGCTGTGCAGT	AAAATCCTACCCTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccca[g/a]tgaaggaaccatggactgtgttcatccgctcactgctttgcctatggctccagctgcaaatttgagtgccagcccggctacagagtgaggggcttggacatgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGTGAGGGTAGGATTTT	209
SELPu20	SELP	T	C	N	N	cds	GE462	TACTCTAGCCATCAAGTGCC	ATATTATTACCTTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgacactcgtggagaattcaatgttggctccacctgtcatttctcttgtaacaa[t/c]ggctttaagctggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCAAAGGTAATAATAT	208
SELPu20	SELP	C	G	S	*	cds	GE483	AACCAGAAAGAAGTGGCAG	AAGGCCCTACCTGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatact[c/g]atggaatatttcccgtaaatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaattgattacctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaataagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgataatgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtccgtcagcccctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGCCTT	393
SELPu21	SELP	T	A	N	K	cds	GE483	AACCAGAAAGAAGTGGCAG	AAGGCCCTACCTGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatactcatggaatatttcccgtaaatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaattgattacctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaa[t/a]aagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgataatgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtccgtcagcccctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGCCTT	393
SELPu22	SELP	T	A	C	S	cds	GE451	TCACAACAGGCATAGCAT	CCTCTGCATGCTGGAGTT	TCACAACAGGCATAGCATcacttcctactccagggttgcaatgtccagccctcaccactcctgggcagggaaccatgtactgtaggcatcatccgggaacctttggtttaataccacttgttactttggctgcaacgctggattcacactcataggagacagcactctcagc[t/a]gcagaccttcaggacaatggacagcagtAACTCCAGCATGCAGAGG	224
SELPu3	SELP	T	A	N	K	cds	GE462	TACTCTAGCCATCAAGTGCC	ATATTATTACCTTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgacactcgtggagaattcaatgttggctccacctgtcatttctcttgtaacaatggctttaagctggaggggcccaa[t/a]aatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCAAAGGTAATAATAT	208
SELPu4	SELP	T	G	S	A	cds	GE462	TACTCTAGCCATCAAGTGCC	ATATTATTACCTTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgacactcgtggagaattcaatgttggctccacctgtcatttctcttgtaacaatggctttaagctggagggcccaataatgtggaatgcacaact[t/g]ctggaagatggtcagctactccacCAACCTGCAAAGGTAATAATAT	208

FIG. 5DDDDDDD

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SELPu5	SELP	T	G	L	V	cds	GE451	TCACAACAGGC ATAGCAT	CCTCTGCATGC TGGAGTT	TCACAACAGGCATAGCATcacttcctactccaggg[t/g]tgcaatgtccagccctcaccactcc tgggcagggaaccatgtactgtaggcatcatccgggaacctttggttttaataccacttgttact ttggctgcaacgctggattcacactcataggagacagcactctcagctgcagaccttcaggacaa tggacagcagtAACTCCAGCATGCAGAGG	224
SELPu6	SELP	A	G	M	V	cds	GE466	TCTCTCCAGCT GTGCAGT	AAAATCCTACC CTCACAGG	TCTCTCCAGCTGTGCAGTgtcagcacctggaagcccccagtgaaggaaccatggactgtgttcat ccgctcactgctttgcctatggctccagctgcaaatttgagtgccagcccggctacagagtgag gggcttggac[a/g]tgctccgctgcattgactctggacactggtctgcacccttgccaaCCTGT GAGGGTAGGATTTT	209
SELPu7	SELP	T	C	C	C	cds	GE462	TACTCTAGCCA TCAAGTGCC	ATATTATTACC TTTGCAGGTTG	TACTCTAGCCATCAAGTGCCcagaactctttgccccagagcagggcagcctggattgttctgaca ctcgtggagaattcaatgttggctccacctg[t/c]catttctcttgtaacaatggctttaagct ggaggggcccaataatgtggaatgcacaacttctggaagatggtcagctactccacCAACCTGCA AAGGTAATAATAT	208
SELPu8	SELP	A	C	T	P	cds	GE452	CAGCTGTGAAA TGCTCAGA	AAAATTGTACC TTGGCAGG	CAGCTGTGAAATGCTCAGAactacatgttaataagccaatagcgatgaactgctccaacctctgg ggaaacttcagttatggatcaatctgctctttccattgtctagagggccagttacttaatggctc tgcacaaacagcatgccaagagaatggccactggtca[a/c]ctaccgtgccaaCCTGCCAAGGT ACAATTTT	203
SELPu9	SELP	A	T	K	*	cds	GE483	AACCAGAAAGA AGTGGCAG	AAGGCCCTACC TGTGTAA	AACCAGAAAGAAGTGGCAGcatggacttatcattacagcacaaaagcatactcatggaatatttc ccgt[a/t]aatactgccagaatcgctacacagacttagtggccatccagaataaaaatgaaatt gattacctcaataaggtcctaccctactacagctcctactactggattgggatccgaaagaacaa taagacatggacatgggtgggaaccaaaaaggctctcaccaacgaggctgagaactgggctgata atgaacctaacaacaaaaggaacaacgaggactgcgtggagatatacatcaagagtccgtcagcc cctggcaagtggaatgatgagcactgcttgaagaaaaagcacgcattgtgTTACACAGGTAGGGC CTT	393
SHBGd3	SHBG	T	C	-	-	noncoding	GE539	TGACATGTCCC TACTCAGCTTT	AACCAGGGGAC TGGGTC	TGACATGTCCCTACTCAGCTTTgtttg[t/c]tttctctttctgatagagtgcccacgaccctcc ggctgtccacctcagcaatggcccaggacaagagcctatcgctgtcatgacctttgacctcacca agatcacaaagtatggggttggcctagcccttGACCCAGTCCCCTGGTT	179
SHBGd4	SHBG	C	T	P	L	cds	GE603	GGCAGAAACAG ATCCCAGG	CCAGCAGTGCT TTACCAAGTC	GGCAGAAACAGATCCCAGGggcctctgatttgcttcccaccttcctgcaggtggaagtcaagat ggagggggactctgtgctgctggaggtggatggggaggaggtgctgcgcctgagacaggtctctg ggcccctgaccagcaaacgccatcccatcatgaggattgcgcttgggggctgctcttccccgct tccaaccttcggttgc[c/t]ggtaactacaccccaggggtggaaccctagccaaGACTTGGTAA AGCACTGCTGG	271
SHBGd5	SHBG	G	A	D	N	cds	GE605	CACCTTAATGC TCTAATGCCA	TTGCTAGTGCA CAGTGAATATT TG	CACCTTAATGCTCTAATGCCAcctttgcactacctccctctaggagaa[g/a]actcttccacct cttttgcctgaatggcctttgggcacaaggtcagaggctggatgtggaccaggccctgaacaga agccatgagatctggactcacagctgcccccagagcccaggcaatggcactgacgcttcccatta aagctccacctaagaaccccctttgaaagttactgattattcatttaattcaaCAAATATTCACT GTGCACTAGCAA	272
SHBGd6	SHBG	C	A	T	N	cds	GE605	CACCTTAATGC TCTAATGCCA	TTGCTAGTGCA CAGTGAATATT TG	CACCTTAATGCTCTAATGCCAcctttgcactacctccctctaggagaagactcttccacctcttt ttgcctgaatggcctttgggcacaaggtcagaggctggatgtggaccaggccctgaacagaagcc atgagatctgga[c/a]tcacagctgcccccagagcccaggcaatggcactgacgcttcccatta aagctccacctaagaaccccctttgaaagttactgattattcatttaattcaaCAAATATTCACT GTGCACTAGCAA	272

FIG. 5EEEEEEE

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SHBGu1	SHBG	G	A	R	H	cds	GE542	TCCCAAGAGTTGTCTGAGCC	AGGGAAGACTGCATGAGCTG	TCCCAAGAGTTGTCTGAGCCgccgagtggacagtggctgattatggagagcagaggcccactggctacctcgcgcctgctgctgttgctgctgttgctactactgcgtcacaccc[g/a]ccagggatgggccctgagacctgttctccccacccaggtgcaggagcgggacagggcactCAGCTCATGCAGTCTTCCCT	200
SHBGu2	SHBG	T	C	S	S	cds	GE1216	GAGTAGGCCCGGCTCAT	GTGCCGCCTCCCTTGAG	GAGTAGGCCCGGCTCATtcttccctctctctaccgtccctttcccacacactctgcagaaggtggtgttgtc[t/c]tctgggtcggggccagggctggatctgcccctggtcttgggactccctcttcagctgaagctgagtatgtccagggtggtcttgagccaagggtcgaagatgaaggcccttgccctgcctcccttaggcctggctcccctccttaacctctgggccaagcctcaagggcgtctcttcctgggggctttaccaggtaagagagaatgatgttcaagttcatgagcacaacattggaaacagCTCAAGGGAGGCGGCAC	336
SLC6A1d9	SLC6A1	C	T	-	-	noncoding	GE1097	AGGAGGAGGGGTCACCAGT	CCTGGTCTACAGTGAGGGTCA	AGGAGGAGGGGTCACCAGTcacccactttcctcccaggtggtctacttttcagccacatacccctacatcatngctgnatcatcctngttcttccgtggagtgacgctgcccggggccaaggagggcatcctcttctacatcacacccaacttccgcaagctgtctgactccgaggtgagtgcccctcccagcc[c/t]ggattctgagccaccacttagcagctttgagataagcttttgcatctttnTGACCCTCACTGTAGACCAGG	270
SLC6A1u1	SLC6A1	G	A	-	-	noncoding	GE1037	CTGCCCCATCGCTGCTTC	CCAACCTGGTTAAGAGAGAGAACT	CTGCCCCATCGCTGCTTCaccatccctcctctcctccccttcttcgctttgcaggatctcaccca[g/a]ggtggcagaaggaggccttctggagctgacccacccccgacgaccatcaggtaacgtcaacagccccggtaacaacatccatgagtggAGTTCTCTCTCTTAACCAGGTTGG	182
SLC6A1u2	SLC6A1	G	A	A	A	cds	GE1149	AGAGCCTTTTCAAGCCCCTA	CAGGATCCTTTTTGCAGGGT	AGAGCCTTTTCAAGCCCCTAgcttgtttatgggttattttgttttgtcattttagggtgnaggcaactccaaggttcctactctctttctgtgcctgttacccaccccgtcctcctagggtgcccttgagccgcaaaactgctgtccacgtggaccgggggtgacatcgcacgtccatctgccaggaccccctgcgtccaaattccgagacatggc[g/a]accaacggcagcaaggtggccgacgggcagatctccaccgaggtcagcgaggcccctgtggccaatgacaagcccaaaaccttggtggtcaaggtgcagaagaaggcggcagacctccccgaccgggacacgtggaagggccgcttcgacttcctcatgtcctgtgtgggctatgccatcggcctgggcaacgtctggaggttcccctatctctgcgggaaaaatggtggggaggtgcctggcccggggactntctggctgggtctggnACCCTGCAAAAAGGATCCTG	511
SLC6A1u3	SLC6A1	A	G	Y	C	cds	GE1149	AGAGCCTTTTCAAGCCCCTA	CAGGATCCTTTTTGCAGGGT	AGAGCCTTTTCAAGCCCCTAgcttgtttatgggttattttgttttgtcattttagggtgnaggcaactccaaggttcctactctctttctgtgcctgttacccaccccgtcctcctagggtgcccttgagccgcaaaactgctgtccacgtggaccgggggtgacatcgcacgtccatctgccaggaccccctgcgtccaaattccgagacatggcgaccaacggcagcaaggtggccgacgggcagatctccaccgaggtcagcgaggcccctgtggccaatgacaagcccaaaaccttggtggtcaaggtgcagaagaaggcggcagacctccccgaccgggacacgtggaagggccgcttcgacttcctcatgtcctgtgtgggct[a/g]tgccatcggcctgggcaacgtctggaggttcccctatctctgcgggaaaaatggtggggaggtgcctggcccggggactntctggctgggtctggnACCCTGCAAAAAGGATCCTG	511
SLC6A1u4	SLC6A1	A	C	R	R	cds	GE1149	AGAGCCTTTTCAAGCCCCTA	CAGGATCCTTTTTGCAGGGT	AGAGCCTTTTCAAGCCCCTAgcttgtttatgggttattttgttttgtcattttagggtgnaggcaactccaaggttcctactctctttctgtgcctgttacccaccccgtcctcctagggtgcccttgagccgcaaaactgctgtccacgtggaccgggggtgacatcgcacgtccatctgccaggaccccctgcgtccaaattccgagacatggcgaccaacggcagcaaggtggccgacgggcagatctccaccgaggtcagcgaggcccctgtggccaatgacaagcccaaaaccttggtggtcaaggtgcagaagaaggcggcagacctccccgaccgggacacgtggaagggccgcttcgacttcctcatgtcctgtgtgggctatgccatcggcctgggcaacgtctgg[a/c]ggttcccctatctctgcgggaaaaatggtggggaggtgcctggcccggggactntctggctgggtctggnACCCTGCAAAAAGGATCCTG	511

FIG. 5FFFFFFF

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SLC6A1 u5	SLC6A 1	C	A	I	I	cds	GE1097	AGGAGGAGGGG TCACCAGT	CCTGGTCTACA GTGAGGGTCA	AGGAGGAGGGGTCACCAGTcacccactttcctcccaggtggtctacttttcagccacatacccct acat[c/a]atngctgnatcatcctngttcttccgtggagtgacgctgcccggggccaaggaggg catcctcttctacatcacacccaacttccgcaagctgtctgactccgaggtgagtgcccctccca gcccggattctgagccaccacttagcagctttgagataagcttttgcatctttnTGACCCTCACT GTAGACCAGG	270
SLC6A1 u6	SLC6A 1	G	T	T	T	cds	GE1078	CCGGCTCCCAC CAGCTC	CCTGTTCCTTT ATCCAGTGCC	CCGGCTCCCACCAGCTCtgtgtaactttctcctccctccactgtttgaccaggcgcaacatgcat cagatgacggacgggctggataagccaggtcagatccgctggccactggccatcac[g/t]ctgg ccatcgcctggatccttgtgtatttctgtatctggaagggtgttggctggactggaaaggtaagg gatatatgtgcacagtggggacaggagGGCACTGGATAAAGGAACAGG	243
SLC6A1 u7	SLC6A 1	T	A	I	N	cds	GE1044	AATTCCGTATT AAATGGACG	GTGGTTTTTGT TGGATGGGG	AATTCCGTATTAAATGGACGngggtntgtgttccgctcccaggcgtgggccttgcggctgctgtg ctatcattctggctgaacatctactaca[t/a]cgtcatcatctcctgggccatttactacctgt acaactccttcaccacggtgagtggtccactttgacccCCCCATCCAACAAAAACCAC	188
SLC6A1 u8	SLC6A 1	G	C	C	S	cds	GE1250	GCAGACACTGC CGTGGA	CTCCTGCCGGG CTCTGG	GCAGACACTGCCGTGGAaacagtgcgacaacccctggaacacagaccgct[g/c]cttctccaac tacagcatggtcaacactaccaacatgaccagcgctgtggtggagttctgggagtgagtatggca taatcaggggatggcagggacggggcatgtcagCCAGAGCCCGGCAGGAG	180
SLC6A3 d13	SLC6A 3	G	A	R	Q	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgc[g/a]gtggcagctcacagcctgcctggtgctggtcatcgtgctgctctacttcagcctctggaagggc gtgaagacctcagggaaggtgaggctcggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 d14	SLC6A 3	G	A	V	M	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaa tgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaa ggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcacca acccgcggcagagcccc[g/a]tggaggcccaggatcgggagacctggggcaagaagatcgactt tctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgct acaAAAATGGTGGCGGTAAG	345
SLC6A3 u1	SLC6A 3	C	G	L	V	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgcggtg gcag[c/g]tcacagcctgcctggtgctggtcatcgtgctgctctacttcagcctctggaagggc gtgaagacctcagggaaggtgaggctcggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 u10	SLC6A 3	G	T	P	P	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaa tgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaa ggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcacca accc[g/t]cggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactt tctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgct acaAAAATGGTGGCGGTAAG	345
SLC6A3 u11	SLC6A 3	C	A	L	I	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgcggtg gcagctcacagcctgcctggtgctggtcatcgtgctgctctacttcagc[c/a]tctggaagggc gtgaagacctcagggaaggtgaggctcggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 u12	SLC6A 3	G	C	V	V	cds	GE1045	TGCAGACGTGG CGTGCT	CCCATGTCTAC AGGCCCAAT	TGCAGACGTGGCGTGCTgcacctccaccagagccatggcatcgacgacctggggcctccgcggtg gcagctcacagcctgcctggtgctggtcatcgtgctgctctacttcagcctctggaagggcgt[g /c]aagacctcagggaaggtgaggctcggggtcaccaATTGGGCCTGTAGACATGGG	188
SLC6A3 u2	SLC6A 3	A	G	I	V	cds	GE1043	CAAGGGCCCTG CCTGTG	ACAGACGCCTC GCAGAGC	CAAGGGCCCTGCCTGTGcagcctggtgacactgtcttctcttgcaggtggtatgg[a/g]tcaca gccaccatgccatacgtggtcctcactgccctgctcctgcgtggggtcaccctccctggagccat agacggcatcagagcatacctgagcgttgacttctaccgGCTCTGCGAGGCGTCTGT	187

FIG. 5GGGGGGG

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SLC6A3 u3	SLC6A 3	G	A	S	S	cds	GE990	TCAGGGCCAGG GCTGAT	CACGGCGCTGT CGATAC	TCAGGGCCAGGGCTGATcttcatcatctacccggaagccatcgccacgctccctctgtcctc[g/a]gcctgggccgtggtcttcttcatcatgctgctcaccctggGTATCGACAGCGCCGTG	124
SLC6A3 u4	SLC6A 3	C	T	A	A	cds	GE1043	CAAGGGCCCTG CCTGTG	ACAGACGCCTC GCAGAGC	CAAGGGCCCTGCCTGTGcagcctggtgacactgtcttctcttgcaggtggtatggatcacagc[c/t]accatgccatacgtggtcctcactgccctgctcctgcgtggggtcaccctccctggagccatagacggcatcagagcatacctgagcgttgacttctaccgGCTCTGCGAGGCGTCTGT	187
SLC6A3 u5	SLC6A 3	C	T	A	A	cds	GE1273	CTTTGTCCTGG CACCGC	AGCCTTTCTGG TGGCCTCA	CTTTGTCCTGGCACCGCcggctgagagctgcctgacctccgtatctgctggttgcagttcgtggtcgtggtcagcattgtgaccttcagacccccccactacggagcctacatcttccccgactgggccaacgcgctgggctgggtcatcgccacatcctccatggccatggtgcccatctatgcggc[c/t]tacaagttctgcagcctgcctgggtcctttcgagaggtgggtatttggacggggcgccttcacccgagtgTGAGGCCACCAGAAAGGCT	282
SLC6A3 u6	SLC6A 3	C	T	N	N	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaa[c/t]ggagtgcagctcaccagctccaccctcaccaacccgcggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactttctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A3 u7	SLC6A 3	C	T	P	P	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcaccaacccgcggcagagccc[c/t]gtggaggcccaggatcgggagacctggggcaagaagatcgactttctcctgtccgtcattggctttgctgtggacctggccaacgtctggcggttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A3 u8	SLC6A 3	G	C	R	R	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcaccaacccgcggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactttctcctgtccgtcattggctttgctgtggacctggccaacgtctggcg[g/c]ttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A3 u9	SLC6A 3	C	G	A	G	cds	GE1128	TGAAGACCAAG AGGGAAG	CTTACCGCCAC CATTTT	TGAAGACCAAGAGGGAAGaagcacagaattcctcaactcccagtgtgcccatgagtaagagcaaatgctccgtgggactcatgtcttccgtggtggccccggctaaggagcccaatgccgtgggcccgaaggaggtggagctcatccttgtcaaggagcagaacggagtgcagctcaccagctccaccctcaccaacccgcggcagagccccgtggaggcccaggatcgggagacctggggcaagaagatcgactttctcctgtccgtcattggctttgctgtggacctgg[c/g]caacgtctggcggttcccctacctgtgctacaAAAATGGTGGCGGTAAG	345
SLC6A4 d10	SLC6A 4	A	C	K	N	cds	GE1113	CATCTCTATCT GAGTGGATATT GT	TTTTCTCCCAA AACAATTAGTA GTC	CATCTCTATCTGAGTGGATATTGTtaaggttttaatgtgtcttggaatttctgttttagttcatcatttgcagttttctgatgagcccgccacaactacgactttccaatataattatccttactggagtatcatcttgggttactgcataggaacctcatctttcatttgcatccccacatatatagcttatcggttgatcatcactccagggacatttaa[a/c]gaggtacgtgctagttagtgtgtatatgtgtgtgttcaGACTACTAATTGTTTTGGGAGAAAA	292
SLC6A4 d9	SLC6A 4	G	A	T	T	cds	GE1071	TGTGACATCTT TGTAGGACAGG T	CCTCCTTTCCT CTTCATCC	TGTGACATCTTTGTAGGACAGGTcttgtcaaccacctcctcctctctcccctctgtctcaggtcccagcctcctcttcatcacgtatgcagaagcgatagccaacatgccagcgtccactttctttgccatcatcttctttctgatgttaatcacgctgggcttggacagcac[g/a]gtgaggaaatgggaagg ggaaatgggctgtgggaGGATGAAGAGGAAAGGAGG	231

FIG. 5HHHHHHH

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
SLC6A4 u1	SLC6A 4	G	C	K	N	cds	GE1124	CCGTTGGGCCA CCCTTA	TGGCCTGCCCC TAACAGG	CCGTTGGGCCACCCTTAaactcggcctctgtctctccatcttacccactgcccagggattggtta tgccatctgcatcattgccttttacattgcttcctactacaacaccatcatggcctgggcgctat actacctcatctcctccttcacggaccagctgccctggaccagctgcaa[g/c]aactcctggaa cactggcaactgcaccaattacttctccgaggacaacatcacctggaccctccattccacgtccc ctgctgaagaattttacacgcgccacgtaagtcacgtaagtaggggttggCCTGTTAGGGGCAGG CCA	328
SLC6A4 u2	SLC6A 4	C	A	-	-	noncoding	GE1027	AGCATCAGTAA CCTGCACACTC	ATTTGCAAGCC CGACTGGT	AGCATCAGTAACCTGCACACTCttctccctaggtctcctggaggcaaggcgaccttgcttgccct ctattgcagaataacaaggggcttagccacaggagttg[c/a]tggcaagtggaaagaagaacaa atggtgagcagcagggaagtttaaggACCAGTCGGGCTTGCAAAT	175
SLC6A4 u3	SLC6A 4	A	C	-	-	noncoding	GE1027	AGCATCAGTAA CCTGCACACTC	ATTTGCAAGCC CGACTGGT	AGCATCAGTAACCTGCACACTCttctccctaggtctcctggaggcaaggcgaccttgcttgccct ct[a/c]ttgcagaataacaaggggcttagccacaggagttgctggcaagtggaaagaagaacaa atggtgagcagcagggaagtttaaggACCAGTCGGGCTTGCAAAT	175
SLC6A4 u4	SLC6A 4	G	C	G	A	cds	GE1145	AAATCCAAGCA CCCAGAGAT	ACTCCGGGTCA CAGCCCAC	AAATCCAAGCACCCAGAGATcaattgggatccttggcagatggacatcagtgtcatttactaacc agcaggatggagacgacgcccttgaattctcagaagcagctatcagcgtgtgaagatggagaaga ttgtcaggaaaacggagttctacagaaggttgttcccaccccaggggacaaagtggagtccgggc aaatatccaatgggtactcagcagttccaagtcctggtgcgg[g/a]agatgacacacggcactc tatcccagcgaccaccaccaccctagtggctgagcttcatcaaggggaacgggagacctggggca agaaggtggatttccttctctcagtgattggctatgctgtggacctgggcaatgtctggcgcttc ccctacatatgttaccagaatggagggggtcagtatcacaggctgcgagtagtggctgtgaccca ggGTGGGCTGTGACCCGGAGT	476
SLC6A4 u5	SLC6A 4	G	C	M	I	cds	GE1124	CCGTTGGGCCA CCCTTA	TGGCCTGCCCC TAACAGG	CCGTTGGGCCACCCTTAaactcggcctctgtctctccatcttacccactgcccagggattggtta tgccatctgcatcattgccttttacattgcttcctactacaacaccatcat[g/c]gcctgggcg ctatactacctcatctcctccttcacggaccagctgccctggaccagctgcaagaactcctggaa cactggcaactgcaccaattacttctccgaggacaacatcacctggaccctccattccacgtccc ctgctgaagaattttacacgcgccacgtaagtcacgtaagtaggggttggCCTGTTAGGGGCAGG CCA	328
SLC6A4 u6	SLC6A 4	C	T	F	F	cds	GE1124	CCGTTGGGCCA CCCTTA	TGGCCTGCCCC TAACAGG	CCGTTGGGCCACCCTTAaactcggcctctgtctctccatcttacccactgcccagggattggtta tgccatctgcatcattgccttttacattgcttcctactacaacaccatcatggcctgggcgctat actacctcatctcctccttcacggaccagctgccctggaccagctgcaagaactcctggaacact ggcaactgcaccaattactt[c/t]tccgaggacaacatcacctggaccctccattccacgtccc ctgctgaagaattttacacgcgccacgtaagtcacgtaagtaggggttggCCTGTTAGGGGCAGG CCA	328
SLC6A4 u7	SLC6A 4	C	A	-	-	noncoding	GE1027	AGCATCAGTAA CCTGCACACTC	ATTTGCAAGCC CGACTGGT	AGCATCAGTAACCTGCACACTCttctccctaggtctcctggaggcaagg[c/a]gaccttgcttg ccctctattgcagaataacaaggggcttagccacaggagttgctggcaagtggaaagaagaacaa atggtgagcagcagggaagtttaaggACCAGTCGGGCTTGCAAAT	175
SLC6A4 u8	SLC6A 4	A	G	T	A	cds	GE1079	CTTAGACCCCT GATCTTGGA	TCAAAGCAAAG CAACTCAG	CTTAGACCCCTGATCTTGGAactgtctcaggcggccccttgggtttcccctccagagatgccct ggtg[a/g]ccagcgtggtgaactgcatgacgagcttcgtttcgggatttgtcatcttcacagtg ctcggttacatggctgagatgaggaatgaagatgtgtctgaggtggccaaagacgcaggtaggac ctcgggttctatgcaggtcccttgctcctaCTGAGTTGCTTTGCTTTGA	244
TBXAS1 a15	TBXAS 1	C	A	L	I	cds	GE282	CCTTCATCTGC AGCCATTT	TTGTCAGCAAT TATGGACAGTT A	CCTTCATCTGCAGCCATTTagggtgtactcccggcatggtgccctaattacacctttgttatcca ttatcagatggttcccctcatcagccaagcctgcgaccttt[c/a]tcctggctcatttaaaacgc tatgcggaatctggggacgcatttgacatccagaggtaaggctgctgcattacagatgagaaatc gagtttttgaatcactgcttcttgTAACTGTCCATAATTGCTGACAA	242

FIG. 5IIIIIII

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
TBXAS1a16	TBXAS1	A	G	-	-	noncoding	GE332	CGAGATTGAAATTTAAGGAAAAGAC	CCAGAAACACAAGTGGTAACTGA	CGAGATTGAAATTTAAGGAAAAGACaaaatgctgtgagatttggctaacacga[a/g]cttctccctttgtcacgacccctccatcagatggcccctgagttctgcagcctcgaggaaggcctgccctatctggacatggtgattgcagagacgctgaggatgtacccgccagctttcaggtgtgtggtagccccctcccctgcccgagtccccacctcctacccctacccccctgccccagcctgcaggtcagggccctcctccaTCAGTTACCACTTGTGTTTCTGG	289
TBXAS1a17	TBXAS1	C	T	-	-	noncoding	GE332	CGAGATTGAAATTTAAGGAAAAGAC	CCAGAAACACAAGTGGTAACTGA	CGAGATTGAAATTTAAGGAAAAGACaaaatgctgtgagatttggctaacacgaacttctcccttttgtcacgacccctccat[c/t]agatggcccctgagttctgcagcctcgaggaaggcctgccctatctggacatggtgattgcagagacgctgaggatgtacccgccagctttcaggtgtgtggtagccccctcccctgcccgagtccccacctcctacccctacccccctgccccagcctgcaggtcagggccctcctccaTCAGTTACCACTTGTGTTTCTGG	289
TBXAS1d12	TBXAS1	C	G	Q	E	cds	GE257	TGCTGTTCCAAATTGTTTACTGA	TTCAACACGTGAAAATCAAAAT	TGCTGTTCCAAATTGTTTACTGAataagtttgaataattggaattttgcttaatcttattcttactatagtgctgtgtttccttcaggggtttttgggaaagc[c/g]aaatggagctcagaaagctgtatggacctctgtgtgggtaagaaggaaactcaaccgttctattatgtacgatattttctattatgtacgatATTTTGATTTTCACGTGTTGAA	222
TBXAS1d13	TBXAS1	G	A	R	H	cds	GE326	TGGAAACCTATTCTTTTGCCTTT	TACAGCCATGAGCCACTGT	TGGAAACCTATTCTTTTGCCTTTacttccagagagctcagtaattctaggttcctaatagagcctaaagcatgagtgcaacttcatttctcagcttttgaaatctgcttttccctccaggtactccacatcagcattctcaagactggagaagttaggcctcagacatcccaagccttctcctttcattggaaacttgacatttttcc[g/a]ccaggtaagggctgtcttccattggcttccatcataaaatatgctgagggccaggcACAGTGGCTCATGGCTGTA	288
TBXAS1d14	TBXAS1	G	A	-	-	noncoding	GE355	CTTGGAGCATCCTTGTCTCA	GCTCTCACGCAGAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagggagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagcagcaccggcccttcacgtacctgcccttcggggccggcccacggagctgcctcggggtgcatctagggctgcttgaggtcaagttgacactgctccacgtgctgcacaagttccggttccaagcctgccctgagacccaggtgaggccccccctgctcagaggcag[g/a]tacaggggcagcggtgggagggccaccCCAGTTCTCTGCGTGAGAGC	347
TBXAS1u1	TBXAS1	G	C	V	L	cds	GE355	CTTGGAGCATCCTTGTCTCA	GCTCTCACGCAGAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagggagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagcagcaccggcccttcacgtacctgcccttcggggccggcccacggagctgcctcggggtgcatctagggctgcttgaggtcaagttgacactgctccac[g/c]tgctgcacaagttccggttccaagcctgccctgagacccaggtgaggccccccctgctcagaggcaggtacaggggcagcggtgggagggccaccCCAGTTCTCTGCGTGAGAGC	347
TBXAS1u10	TBXAS1	A	C	-	-	noncoding	GE249	ATGGACCTGTATTGCCACCA	GAGAGTTTGCATTTCTCATGTCTTA	ATGGACCTGTATTGCCACCAaggtggctttggctccctgagtcctgaccctctgcttgtt[a/c]cttcccaacaggcgtcgggtttggagttcaagtcggtagccgacagcgttctgtttttacgtgacaaaagatgggaagaggtcagaggtgccctgatgtctgctttcagtcctgaaaagctgaacgaggTAAGACATGAGAAATGCAAACTCTC	219
TBXAS1u11	TBXAS1	C	T	T	M	cds	GE355	CTTGGAGCATCCTTGTCTCA	GCTCTCACGCAGAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagggagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagcagcaccggcccttca[c/t]gtacctgcccttcggggccggcccacggagctgcctcggggtgcatctagggctgcttgaggtcaagttgacactgctccacgtgctgcacaagttccggttccaagcctgccctgagacccaggtgaggccccccctgctcagaggcaggtacaggggcagcggtgggagggccaccCCAGTTCTCTGCGTGAGAGC	347

FIG. 5JJJJJJJ

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
TBXAS1 u2	TBXAS 1	G	A	A	T	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagctcaggactgcgaggtgctggggcagcg catccccgcaggc[g/a]ctgtgctagagatggccgtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237
TBXAS1 u3	TBXAS 1	C	T	A	A	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagctcaggactgcgaggtgctggggcagcg catccccgcaggcgctgtgctagagatggc[c/t]gtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237
TBXAS1 u4	TBXAS 1	C	G	Q	E	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagct[c/g]aggactgcgaggtgctggggc agcgcatccccgcaggcgctgtgctagagatggccgtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237
TBXAS1 u5	TBXAS 1	G	A	R	Q	cds	GE355	CTTGGAGCATC CTTGTCTCA	GCTCTCACGCA GAGAACTGG	CTTGGAGCATCCTTGTCTCAgatgcaggggtggctcagctggagcacagggctgcagaggggagg gagcgggtgttctgggccagccctgaccacacggacctgcaggttcacggctgaggcccggcagc agcaccggcccttcacgtacctgcccttcggggccggcccacggagctgcctcggggtgcatcta gggctgcttgaggtcaagttgacactgctccacgtgctgcacaagttcc[g/a]gttccaagcct gccctgagacccaggtgaggccccccctgctcagaggcaggtacaggggcagcggtgggagggcca ccCCAGTTCTCTGCGTGAGAGC	347
TBXAS1 u6	TBXAS 1	T	G	V	G	cds	GE470	GGCCCTGGTTT ATTATCACC	CCAAAGTCGGC TCCATTC	GGCCCTGGTTTATTATCACCcccttttcaatgccactttttgtttttctctttcaagtatcatttc catccataatggtcccactggcccggatttgcccaataagaaccgagacgaactgaatggcttt tttaacaaactcattaggaatg[t/g]gattgccttgcgggaccagcaagctgccgaagaggtaa cgtatttaataggacacagccttgaaatgGAATGGAGCCGACTTTGG	243
TBXAS1 u7	TBXAS 1	T	C	I	T	cds	GE912	GCCCATGTATC TTCCTCCTTT	GGGGGATCCAA CTTGTACT	GCCCATGTATCTTCCTCCTTTgttctccaggaagcctcactcttcatgactgtaaggtcaaaatg tgcatttttctccttttgttccttagaggcggagagacttcctccaaatggtcctggatgcccga cattctgcaagtcccatgggcgtgcaagactttgacatcgtcagagacgttttctcctctactgg gtgcaagccgaacccttcccggcaacaccagcccagccctatggccaggcctttgactgtggatg aga[t/c]tgtgggccaggccttcatcttcctcatcgctggctatgaaatcatcaccaacacact ttcttttgccacctacctactggccaccaaccctgactgccaagagaagcttctgagagaggtag acgtttttaaggagaaacacgtgAGTACAAGTTGGATCCCCC	432
TBXAS1 u8	TBXAS 1	C	G	L	V	cds	GE912	GCCCATGTATC TTCCTCCTTT	GGGGGATCCAA CTTGTACT	GCCCATGTATCTTCCTCCTTTgttctccaggaagcctcactcttcatgactgtaaggtcaaaatg tgcatttttctccttttgttccttagaggcggagagacttcctccaaatggtcctggatgcccga cattctgcaagtcccatgggcgtgcaagactttgacatcgtcagagacgttttctcctctactgg gtgcaagccgaacccttcccggcaacaccagcccagccctatggccaggcctttgactgtggatg agattgtgggccaggccttcatcttcctcatcgctggctatgaaatcatcaccaacacactttct tttgccacctac[c/g]tactggccaccaaccctgactgccaagagaagcttctgagagaggtag acgtttttaaggagaaacacgtgAGTACAAGTTGGATCCCCC	432
TBXAS1 u9	TBXAS 1	T	G	M	R	cds	GE274	CGACCTGGTGT TTCCCTCA	TGCTGCCTCCA CTGGTAAAT	CGACCTGGTGTTTCCCTCAgattcacacgggaggcagctcaggactgcgaggtgctggggcagcg catccccgcaggcgctgtgctagaga[t/g]ggccgtgggtgccctgcaccatgaccctgagcac tggccaagcccggagaccttcaaccctgaaaggtgagtactgccccttttaaaaagctctgaagg gatgtgagtgtgtgggatagaaATTTACCAGTGGAGGCAGCA	237

FIG. 5KKKKKKK

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THBDu1	THBD	T	G	C	G	cds	GE409	TCGGCTTACAG CTAATGTGC	GCCAGCTAAGG TGCTTTGGT	TCGGCTTACAGCTAATGTGCaccgcgccgcccggagcggtccaggggcactgggccagggaggcg ccgggcgcttgggactgcagcgtggagaacggcggctgcgagcacgcgtgcaatgcgatccctgg ggctccccgctgccagtgcccagccggcgccgccctgcaggcagacgggcgctcctgcaccgcat ccgcgacgcagtcctgcaacgacctctgcgagcacttctgcgttcccaaccccgaccagccgggc tcctactcgtgcatgtgcgagaccggctaccggctggcggccgaccaacaccggtgcgaggacgt ggatgactgcatactggagcccagtccgtgtccgcagcgctgtgtcaacacacagggtggcttcg agtgccactgctaccctaactacgacctggtggacggcgag[t/g]gtgtggagcccgtggaccc gtgcttcagagccaactgcgagtaccagtgccagcccctgaaccaaactagctacctctgcgtct gcgccgagggcttcgcgcccattccccacgagccgcacaggtgccagatgttttgcaaccagact gcctgtccagccgactgcgaccccaacacccaggctagctgtgagtgccctgaaggctacatcct ggacgacggtttcatctgcacggacatcgacgagtgcgaaaacggcggcttctgctccggggtgt gccacaacctccccggtaccttcgagtgcatctgcgggcccgactcggcccttgcccgccacatt ggcaccgactgtgactccggcaaggtggacggtggcgacagcggctctggcgagcccccgcccag cccgacgcccggctccaccttgactcctccggccgtggggctcgtgcattcgggcttgctcatag gcatctccatcgcgagcctgtgcctggtggtggcgcttttggcgctcctctgccacctgcgcaag aagcagggcgccgccagggccaagatggagtacaagtgcgcggcccctt	1164
THBDu2	THBD	C	A	P	T	cds	GE409	TCGGCTTACAG CTAATGTGC	GCCAGCTAAGG TGCTTTGGT	TCGGCTTACAGCTAATGTGCaccgcgccgcccggagcggtccaggggcactgggccagggaggcg ccgggcgcttgggactgcagcgtggagaacggcggctgcgagcacgcgtgcaatgcgatccctgg ggctccccgctgccagtgcccagccggcgccgccctgcaggcagacgggcgctcctgcaccgcat ccgcgacgcagtcctgcaacgacctctgcgagcacttctgcgttcccaaccccgaccagccgggc tcctactcgtgcatgtgcgagaccggctaccggctggcggccgaccaacaccggtgcgaggacgt ggatgactgcatactggagcccagtccgtgtccgcagcgctgtgtcaacacacagggtggcttcg agtgccactgctaccctaactacgacctggtggacggcgagtgtgtggagcccgtggacccgtgc ttcagagccaactgcgagtaccagtgccag[c/a]ccctgaaccaaactagctacctctgcgtct gcgccgagggcttcgcgcccattccccacgagccgcacaggtgccagatgttttgcaaccagact gcctgtccagccgactgcgaccccaacacccaggctagctgtgagtgccctgaaggctacatcct ggacgacggtttcatctgcacggacatcgacgagtgcgaaaacggcggcttctgctccggggtgt gccacaacctccccggtaccttcgagtgcatctgcgggcccgactcggcccttgcccgccacatt ggcaccgactgtgactccggcaaggtggacggtggcgacagcggctctggcgagcccccgcccag cccgacgcccggctccaccttgactcctccggccgtggggctcgtgcattcgggcttgctcatag gcatctccatcgcgagcctgtgcctggtggtggcgcttttggcgctcctctgccacctgcgcaag aagcagggcgccgccagggccaagatggagtacaagtgcgcggcccctt	1164

FIG. 5LLLLLLL

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THBDu3	THBD	C	T	P	P	cds	GE407	GACGGACAGGAGAGGCTGT	GGTTGGGAACGCAGAAGTG	GACGGACAGGAGAGGCTGTcgccatcggcgtcctgtgcccctctgctccggcacggccctgtcgcagtgcccgcgctttccccggcgcctgcacgcggcgcgcctgggtaacatgcttggggtcctggtccttggcgcgctggccctggccggcctggggttccccgcacccgcagagccgcagccgggtggcagccagtgcgtcgagcacgactgcttcgcgctctacccgggccccgcgaccttcctcaatgccagtcagatctgcgacggactgcggggccacctaatgacagtgcgctcctcggtggctgccgatgtcatttccttgctactgaacggcgacggcggcgttggccgccggcgcctctggatcggcctgcagctgccacccggctgcggcgaccccaagcgcctcgggcccctgcgcggcttccagtgggttacgggagacaacaacaccagctatagcaggtgggcacggctcgacctcaatggggctcccctctgcggcccgttgtgcgtcgctgtctccgctgctgaggccactgtgcccagcgagccgatctgggaggagcagcagtgcgaagtgaaggccgatggcttcctctgcgagttccacttcccagccacctgcaggccactggctgtggagcccggcgccgcggctgccgccgtctcgatcacctacggcaccccgttcgcggcccgcggagcggacttccaggcgctgccggtgggcagctccgccgcggtggctcc[c/t]ctcggcttacagctaatgtgcaccgcgccgcccggagcggtccaggggcactgggccagggaggcgccgggcgcttgggactgcagcgtggagaacggcggctgcgagcacgcgtgcaatgcgatccctggggctccccgctgccagtgcccagccggcgccgccctgcaggcagacgggcgctcctgcaccgcatccgcgacgcagtcctgcaacgacctctgcgagCACTTCTGCGTTCCCAACC	1014
THPOa6	THPO	G	A	-	-	noncoding	GE416	GGCATCCTGTCTTTCCTACTTAGAC	AGGAAATCTTGTCCAGTTGTCTC	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcaggaccatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccatcttcctgagcttccaacacctgctccgaggaaaggtgcgtttcctgatgcttgtaggagggtccaccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcacactgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagccagaactactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctgaaccaaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaatggaactcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcaggaacatcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccatcctcctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagctccaccccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacatcctacacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagcattgtctc[g/a]tgtacagctcccttccctgcagggcgcccctggGAGACAACTGGACAAGATTTCCT	844
THPOa7	THPO	G	A	-	-	noncoding	GE416	GGCATCCTGTCTTTCCTACTTAGAC	AGGAAATCTTGTCCAGTTGTCTC	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcaggaccatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccatcttcctgagcttccaacacctgctccgaggaaaggtgcgtttcctgatgcttgtaggagggtccaccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcacactgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagccagaactactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctgaaccaaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaatggaactcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcaggaacatcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccatcctcctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagctccaccccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacatcctacacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagcattgtctcgtgtacagctcccttccctgcagg[g/a]cgcccctggGAGACAACTGGACAAGATTTCCT	844

FIG. 5MMMMMMM

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THPOd5	THPO	C	?	-	-	noncoding	GE345	TCACTCTGCTG GCTACTCCTAA	CCTTCTTCCCT CAGGTCTTCTA	TCACTCTGCTGGCTACTCCTAAggctccccacccgcttttagtgtgccctttgaggcagtgcgct tctctcttccatctctttctcaggaggagaccaaggcacaggacattctgggagcagtgaccctt ctgctggagggagtgatggcagcacggggacaactgggacccacttgcctctcatccctcctggg gcagctttctggacaggtccgtctcctccttggggccctgcagagcctccttggaacccaggtaa gtccccagtcaagggatctgtagaaactgttcttttctgactcagtccc[c/]cTAGAAGACCTG AGGGAAGAAGG	336
THPOu1	THPO	T	A	S	T	cds	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcagg accatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccat cttcctgagcttccaacacctgctccgaggaaaggtgcgtttcctgatgcttgtaggagggtcca ccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcaca ctgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcc[t/a]cagcca gaactactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctg aaccaaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaa tggaactcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcag gaacatcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccat cctcctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagct ccacccccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacat cctacacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagca ttgtctcgtgtacagctcccttccctgcagggcgcccctggGAGACAACTGGACAAGATTTCCT	844
THPOu2	THPO	A	G	Q	R	cds	GE265	TGGAGGACTAG CCTGCTTATTA	AGAATCCATGG GAAGCAGTG	TGGAGGACTAGCCTGCTTATTAggctaccatagctctctctatttcagctcccttctccccccac caatctttttcaacagagcc[a/g]gtgcccagaggttcaccctttgcctacacctgtcctgctg cctgctgtggactttagcttgggagaatggaaaacccagatggtaagaaagccatccctaacctt ggcttccctaagtcctgtcttcagtttccCACTGCTTCCCATGGATTCT	244
THPOu3	THPO	G	A	G	R	cds	GE416	GGCATCCTGTC TTTCCTACTTA GAC	AGGAAATCTTG TCCAGTTGTCT C	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcagg accatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccat cttcctgagcttccaacacctgctccgaggaaaggtgcgtttcctgatgcttgtaggagggtcca ccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcaca ctgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagccagaac tactggctctgggcttctgaagtggcagcag[g/a]gattcagagccaagattcctggtctgctg aaccaaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaa tggaactcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcag gaacatcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccat cctcctactggacagtatacgctcttccctcttccacccaccttgcccacccctgtggtccagct ccacccccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacat cctacacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagca ttgtctcgtgtacagctcccttccctgcagggcgcccctggGAGACAACTGGACAAGATTTCCT	844

FIG. 5NNNNNNN

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
THPOu4	THPO	A	T	K	M	cds	GE416	GGCATCCTGTCTTTCCTACTTAGAC	AGGAAATCTTGTCCAGTTGTCTC	GGCATCCTGTCTTTCCTACTTAGACaagggaggcctgagatctggccctggtgtttggcctcaggaccatcctctgccctcagcttcctccacagggcaggaccacagctcacaaggatcccaatgccatcttcctgagcttccaacacctgctccgaggaa[a/t]ggtgcgtttcctgatgcttgtaggagggtccaccctctgcgtcaggcgggccccacccaccacagctgtccccagcagaacctctctagtcctcacactgaacgagctcccaaacaggacttctggattgttggagacaaacttcactgcctcagccagaactactggctctgggcttctgaagtggcagcagggattcagagccaagattcctggtctgctgaaccaaacctccaggtccctggaccaaatccccggatacctgaacaggatacacgaactcttgaatggaactcgtggactctttcctggaccctcacgcaggaccctaggagccccggacatttcctcaggaacatcagacacaggctccctgccacccaacctccagcctggatattctccttccccaacccatcctcctactggacagtatacgctcttccctcttccacccaccttgcccaccccctgtggtccagctccacccccctgcttcctgacccttctgctccaacgcccacccctaccagccctcttctaaacacatcctacacccactcccagaatctgtctcaggaagggtaaggttctcagacactgccgacatcagcattgtctcgtgtacagctcccttccctgcagggcgcccctggGAGACAACTGGACAAGATTTCCT	844
THu1	TH	G	A	S	S	cds	GE1125	GGTCCCCGGGTCTCAGC	AGCCCCACCCACAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttcattgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagcggccgctgcagtcccctc[g/a]gagcccggggacccccctggaggctgtggcctttgaggagaaggaggggaaggccgtgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccgagctgtgaaggtgtttgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGTGGGGCT	331
THu2	TH	G	A	V	M	cds	GE1125	GGTCCCCGGGTCTCAGC	AGCCCCACCCACAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttcattgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagcggccgctgcagtcccctcggagcccggggacccccctggaggctgtggcctttgaggagaaggaggggaaggcc[g/a]tgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccgagctgtgaaggtgtttgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGTGGGGCT	331
THu3	TH	T	G	F	C	cds	GE1125	GGTCCCCGGGTCTCAGC	AGCCCCACCCACAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttcattgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagcggccgctgcagtcccctcggagcccggggacccccctggaggctgtggcctttgaggagaaggaggggaaggccgtgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccgagctgtgaaggtgt[t/g]tgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGTGGGGCT	331
THu4	TH	G	A	K	K	cds	GE1020	CTGCCCGCAGGAAGGAG	CTGGGCACACCCTTCAG	CTGCCCGCAGGAAGGAGgtctacaccacgctgaa[g/a]ggcctctacgccacgcacgcctgcggggagcacctggaggcctttgctttgctggagcgcttcagcggctaccgggaagacaatatcccccagctggaggacgtctcccgcttcCTGAAGGGTGTGCCCAG	170
THu5	TH	T	C	A	A	cds	GE1125	GGTCCCCGGGTCTCAGC	AGCCCCACCCACAGGTGA	GGTCCCCGGGTCTCAGCaggtggaggaggcatgggtgccccttgtccccacagtccccgcggttcattgggcgcaggcagagcctcatcgaggacgcccgcaaggagcgggaggcggcggtggcagcagcggccgctgcagtcccctcggagcccggggacccccctggaggc[t/c]gtggcctttgaggagaaggaggggaaggccgtgctaaacctgctcttctccccgagggccaccaagccctcggcgctgtcccgagctgtgaaggtgtttgaggtgagctggtggccttcgtgtccctggggcaagtTCACCTGTGGGTGGGGCT	331
THu6	TH	G	T	A	A	cds	GE972	TACGCGCAGGGACTGCT	GCGTACCTGCGAGAACT	TACGCGCAGGGACTGCTgccacgagctgctggggcacgtgcccatgctggccgaccgcaccttcgc[g/t]cAGTTCTCGCAGGTACGC	89

FIG. 50000000

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
VLDLRd 13	VLDLR	C	T	A	A	cds	GE926	GAAAGACCTTG CCTTCTTAAAG C	CAAGTGACAAT GACTTATGTCA AGA	GAAAGACCTTGCCTTCTTAAAGCaaaactaagtaacccagacttccatcttgcaggcaaagagcc aagtctgatcttcactaatcgaagagacatcaggaagattggcttagagaggaaagaatatatcc aactagttgaacagctaagaaacactgtggctctcgatgctgacattgctgcccagaaactattc tgggc[c/t]gatctaagccaaaaggctatcttcaggtaactttcagttccttttgtggtgTCTT GACATAAGTCATTGTCACTTG	281
VLDLRd 14	VLDLR	A	T	-	-	noncoding	GE926	GAAAGACCTTG CCTTCTTAAAG C	CAAGTGACAAT GACTTATGTCA AGA	GAAAGACCTTGCCTTCTTAAAGCaaaactaagtaaccc[a/t]gacttccatcttgcaggcaaag agccaagtctgatcttcactaatcgaagagacatcaggaagattggcttagagaggaaagaatat atccaactagttgaacagctaagaaacactgtggctctcgatgctgacattgctgcccagaaact attctgggccgatctaagccaaaaggctatcttcaggtaactttcagttccttttgtggtgTCTT GACATAAGTCATTGTCACTTG	281
VLDLRd 15	VLDLR	G	T	-	-	noncoding	GE937	AGGTTTTGGCT CCTTACC	GGTAGCTCCAG ATGAACAAAAA	AGGTTTTGGCTCCTTACCtgatgggtaaatttctaagtctgaatacagatccttctaaactgatt cctttattcctctgtagggatcaatgtgaccacagcagtatcagaggtcagtgttcccccaaaa gggacttctgccgcatgggccattcttcctctctgtaagta[g/t]atttcctannngtctgggt tcaagaacttcttagataccagatgaagatTTTTTGTTCATCTGGAGCTACC	247
VLDLRd 16	VLDLR	G	A	E	K	cds	GE940	CCTGGGTTTTA AATGTGAAAGA TA	TATCCTTTCCC ATCACCTGC	CCTGGGTTTTAAATGTGAAAGATAttaattgaaaataagttgtcaagtgantantacattttat tccagatataaacgaatgcttggtaaataatggtggatgttctcatatctgcaaagacctagtta taggctac[g/a]agtgtgactgtgcagctgggtttgaactgatagataggaaaacctgtggagg tgagtctaagaagaaaacctggaccctGCAGGTGATGGGAAAGGATA	242
VLDLRd 17	VLDLR	C	T	N	N	cds	GE953	TTTTCACAGCT TTGTTTACTGG T	TGAAGATAGTT GAGTGGGTGGT	TTTTCACAGCTTTGTTTACTGGTcagactggggtgaaccagctaaaatagaaaaagcaggaatga atggattcgatagacgtccactggtgacagcggatatccagtggcctaa[c/t]ggaattacact tggtatgtatgttcttccttctcgACCACCCACTCAACTATCTTCA	176
VLDLRu 1	VLDLR	A	G	T	A	cds	GE920	GCTCTAATTGT GTCAAACTCTT AAAT	GACCTACACAG ATACCATTCCA AAG	GCTCTAATTGTGTCAAACTCTTAAATttcttgtgacctattctgtttcagtgcctcaattgatga caaggttggtagacatgttaaaatgatcgacaatgtctataatcctgcagccattgctgttgatt gggtgtacaagaccatctactggactgatgcggcttctaagactatttcagtagctaccctagat gga[a/g]ccaagaggaagttcctgtttaactctgacttgcgagagcctgcctccatagctgtgg acccactgtctgggtttgtagtctgtttccatcacagaCTTTGGAATGGTATCTGTGTAGGTC	324
VLDLRu 10	VLDLR	A	T	S	C	cds	GE937	AGGTTTTGGCT CCTTACC	GGTAGCTCCAG ATGAACAAAAA	AGGTTTTGGCTCCTTACCtgatgggtaaatttctaagtctgaatacagatccttctaaactgatt cctttattcctctgtagggatcaatgtgaccacagcagtatcagaggtc[a/t]gtgttccccc aaaagggacttctgccgcatgggccattcttcctctctgtaagtagatttcctannngtctgggt tcaagaacttcttagataccagatgaagatTTTTTGTTCATCTGGAGCTACC	247
VLDLRu 11	VLDLR	T	C	I	I	cds	GE937	AGGTTTTGGCT CCTTACC	GGTAGCTCCAG ATGAACAAAAA	AGGTTTTGGCTCCTTACCtgatgggtaaatttctaagtctgaatacagatccttctaaactgatt cctttattcctctgtagggatcaatgtgaccacagcagtatcagaggtcagtgttcccccaaaa gggacttctgccgcatgggccat[t/c]cttcctctctgtaagtagatttcctannngtctgggt tcaagaacttcttagataccagatgaagatTTTTTGTTCATCTGGAGCTACC	247
VLDLRu 12	VLDLR	A	T	S	C	cds	GE945	TCCAATACTAG ACTTAGCTCAC TT	GACTTACTGCT GGGTACGTG	TCCAATACTAGACTTAGCTCACTTagctaccctctgatttttttcagtgctcttagtgatggcag cagtaggtggctacttgatgtggcggaattggcaacacaagaacatgaaaagcatgaactttgac aatcctgtgtacttgaaaaccactgaagaggacctctccatagacattggtagacac[a/t]gtg cttctgttggacaCACGTACCCAGCAGTAAGTC	228
VLDLRu 2	VLDLR	A	G	K	R	cds	GE926	GAAAGACCTTG CCTTCTTAAAG C	CAAGTGACAAT GACTTATGTCA AGA	GAAAGACCTTGCCTTCTTAAAGCaaaactaagtaacccagacttccatcttgcaggca[a/g]ag agccaagtctgatcttcactaatcgaagagacatcaggaagattggcttagagaggaaagaatat atccaactagttgaacagctaagaaacactgtggctctcgatgctgacattgctgcccagaaact attctgggccgatctaagccaaaaggctatcttcaggtaactttcagttccttttgtggtgTCTT GACATAAGTCATTGTCACTTG	281

FIG. 5PPPPPPP

Poly Id	Gene	ref NT	alt NT	ref AA	alt AA	coding/ noncoding	Assay #	Forward Primer (5' -> 3')	Reverse Primer (5' -> 3')	Assay Sequence	
VLDLRu 3	VLDLR	A	G	R	R	cds	GE920	GCTCTAATTGTGTCAAACTCTTAAAT	GACCTACACAGATACCATTCCAAAG	GCTCTAATTGTGTCAAACTCTTAAATttcttgtgacctattctgtttcagtgcctcaattgatgacaaggttggtag[a/g]catgttaaaatgatcgacaatgtctataatcctgcagccattgctgttgattgggtgtacaagaccatctactggactgatgcggcttctaagactatttcagtagctaccctagatggaaccaagaggaagttcctgtttaactctgacttgcgagagcctgcctccatagctgtggacccactgtctgggtttgtagtctgttttccatcacagaCTTTGGAATGGTATCTGTGTAGGTC	324
VLDLRu 4	VLDLR	A	G	Q	Q	cds	GE934	GAAATGGACTTGTGTTAATCCTG	TGCTGCTTCCCTTAAAGTAGTTAT	GAAATGGACTTGTGTTAATCCTGgatgtacatgctaattgtgggcttctgttttaggatcgtgtctactggatagatggggaaaatgaagcagtctatggtgccaataaattcactggatcagagctagccactctagtcaacaacctgaatgatgccca[a/g]gacatcattgtctatcatgaacttgtacagccatcaggtaccgtggagaagcacagtccttaATAACTACTTTAAGGGAAGCAGCA	251
VLDLRu 5	VLDLR	A	C	E	A	cds	GE941	GCACCGGAATACCCATTTTA	TTGCTTGTTGTAGGTTCTACTTGTG	GCACCGGAATACCCATTTTAatggtatttttttttcctgactaggtaaaaattggtgtgaagaagacatgg[a/c]gaatggaggatgtgaatacctatgcctgccagcaccacagattaatgatcactctccaaaatatacctgttcctgtcccagtgggtacaatgtagaggaaaatggccgagactgtcaaagtaaggcatttgtgtttcaacCACAAGTAGAACCTACAACAAGCAA	241
VLDLRu 6	VLDLR	C	T	L	F	cds	GE944	TGTACCTAGTAAGGTATAGGAGCAGC	CACTTACTCATAAAGGTACAACAGCC	TGTACCTAGTAAGGTATAGGAGCAGCaagactaattctgatttccctcccagatattgatgaatgccaaaatccaggaatctgcagtcaaatttgtatcaacttaaaaggcggttacaagtgtgaatgtagtcgtggctatcaaatggat[c/t]ttgctactggcgtgtgcaaggcagtaggtaaatgaacttggactggtatGGCTGTTGTACCTTTATGAGTAAGTG	230
VLDLRu 7	VLDLR	G	A	V	I	cds	GE236	ATTCTAGGGAGAAAAGCCAAA	TTTACTTACCACAGTTCTTTTCATCA	ATTCTAGGGAGAAAAGCCAAAtgtgaaccctcccaattccagtgcacaaatggtcgctgtattacgctgttgtggaaatgtgatggggatgaagactgt[g/a]ttgacggcagTGATGAAAAGAACTGTGGTAAGTAAA	140
VLDLRu 8	VLDLR	G	C	C	S	cds	GE911	CCAATCTTGATGCATTTTCAG	CAGTTGATACAGGGAAAAGAACTG	CCAATCTTGATGCATTTTCAGtggggcatcctctctcttaataggcaatataacatgtagtcccgacgagttcacctgctccagtggccgctgcatctccaggaactttgtatgcaatggccaggatgactgcagcgatggcagtgatgagctggactgtgccccgccaacctgtggcgcccatgagttccagt[g/c]cagcacctcctcctgcatccccatcagctgggtatgcgacgatgatgcagactgctccgaccaatctgatgagtccctggagcagtgtggccgtcagccagtcatacacaccaagtgtccagccagcgaaatccagtgcggctctggcgagtgcatccataagaagtggcgatgtgatggggaccctgactgcaaggatggcagtgatgaggtcaactgtcgtaagtagcttcctagcatggcatgttCAGTTCTTTTCCCTGTATCAACTG	471
VLDLRu 9	VLDLR	T	A	I	N	cds	GE941	GCACCGGAATACCCATTTTA	TTGCTTGTTGTAGGTTCTACTTGTG	GCACCGGAATACCCATTTTAatggtatttttttttcctgactaggtaaaaattggtgtgaagaagacatggagaatggaggatgtgaatacctatgcctgccagcaccacaga[t/a]taatgatcactctccaaaatatacctgttcctgtcccagtgggtacaatgtagaggaaaatggccgagactgtcaaagtaaggcatttgtgtttcaacCACAAGTAGAACCTACAACAAGCAA	241

FIG. 5QQQQQQQ

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report: 23 August 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 00/58519 A3

(54) Title: CHARATERIZATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN CODING REGIONS OF HUMAN GENES

(57) Abstract: The invention provides nucleic acid segments of the human genome, particularly nucleic acid segments from the coding region of a gene, including polymorphic sites. Allele-specific primers and probes hybridizing to regions flanking or containing these sites are also provided. The nucleic acids, primers and probes are used in applications such as phenotype correlations, forensics, paternity testing, medicine and genetic analysis.

INTERNATIONAL SEARCH REPORT

Interr   ıal Application No
PCT/US 00/08440

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7   C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 20279 A (RIBOZYME PHARM INC ;WARNER LAMBERT CO (US)) 4 July 1996 (1996-07-04) p. 15, sequence "013a" ---	1
X	US 5 705 388 A (COUTURE L. ET AL.) 6 January 1998 (1998-01-06) SEQ ID 622,623 ---	1

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 November 2000	22.02.01

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Luzzatto, E

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Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE MEDLINE [Online] American medical association Accession Number 92172843, 3 March 1992 (1992-03-03) XP002152537 abstract & SUMI-ICHINOSE C. ET AL.: "Molecular cloning of genomic DNA and chromosomal assignment of the gene for human aromatic L-amino acid decarboxylase, the enzyme for catecholamine and serotonine biosynthesis" BIOCHEMISTRY, vol. 31, no. 8, 1992, pages 2229-2238, US ---	1,11
A	CHEE M ET AL: "ACCESSING GENETIC INFORMATION WITH HIGH-DENSITY DNA ARRAYS" SCIENCE,US,AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,, vol. 274, 25 October 1996 (1996-10-25), pages 610-614, XP002022508 ISSN: 0036-8075 cited in the application the whole document ---	1-12
A	WANG D G ET AL: "Large-scale identification, mapping, and genotyping of single-nucleotide polymorphisms in the human genome" SCIENCE,US,AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,, vol. 280, 1998, pages 1077-1082, XP002089398 ISSN: 0036-8075 cited in the application the whole document ---	1-12
A	OEFNER P J ET AL: "COMPARATIVE DNA SEQUENCING BY DENATURING HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY" AMERICAN JOURNAL OF HUMAN GENETICS,UNIVERSITY OF CHICAGO PRESS, CHICAGO,,US, vol. 57, October 1995 (1995-10), page A266 XP002918646 ISSN: 0002-9297 cited in the application the whole document ---	1-12
A	WO 98 20165 A (WHITEHEAD BIOMEDICAL INST ;HUDSON THOMAS (US); LANDER ERIC S (US);) 14 May 1998 (1998-05-14) page 4, line 1 -page 27, line 23 ---	1-12

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INTERNATIONAL SEARCH REPORT

Intern nal Application No
PCT/US 00/08440

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE GENEBANK [Online] accession number M84597, 18 April 1992 (1992-04-18) ICHINOSE H. ET AL.: "Molecular cloning of genomic DNA and chromosomal assignment of the gene for human aromatic L-amino acid decarboxylase" XP002152538 abstract ---	
A	SYVANEN A -CH ET AL: "IDENTIFICATION OF INDIVIDUALS BY ANALYSIS OF BIALLELIC DNA MARKERS,USING PCR AND SOLID-PHASE MINISEQUENCING" AMERICAN JOURNAL OF HUMAN GENETICS,US,UNIVERSITY OF CHICAGO PRESS, CHICAGO,, vol. 52, no. 1, 1993, pages 46-59, XP002050638 ISSN: 0002-9297 the whole document ---	11,12
A	UNDERHILL P.A. ET AL.: "Detection of numerous Y chromosome biallelic polymorphisms by denaturing high-performance liquid chromatography" GENOME RESEARCH, vol. 7, - 1997 pages 996-1005, XP000942730 US abstract -----	1-12

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Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/08440

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-12 all partly

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-12 (all partly)

   Nucleic acid molecules comprising the polymorphic sites present in the sequences SEQ ID 1927 and 1928 given on fig. 5A (which correspond to the sequences designated AADCd4 and AADCd5 in fig. 5A), and methods based thereon.

2. Claims: 1-12 (all partly)

   Nucleic acid molecules comprising the polymorphic site(s) present in each of the sequences given on figs. 5A (except the sequences AADCd4 and AADCd5), 5B-5QQQQQQQ and methods based thereon.
   The sequences differing only at one or more polymorphic sites are considered to belong to the same invention.
   The different inventions are summarised as indicated in the following table (see annex), where col. 1 and 3 show the SEQ ID number and col. 2 and 4 the length of the sequence.
   The total number of inventions is 396.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 00/08440

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9620279	A	04-07-1996	US	5705388 A	06-01-1998
			AU	4419596 A	19-07-1996
			CA	2208502 A	04-07-1996
			EP	0800580 A	15-10-1997
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			EP	0800580 A	15-10-1997
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			WO	9620279 A	04-07-1996
WO 9820165	A	14-05-1998	EP	0941366 A	15-09-1999